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2 JULY 1986

Europe Report

SCIENCE AND TECHNOLOGY

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EUROPE REPORT

SCIENCE AND TECHNOLOGY

WEST EUROPE

/7310

WEST EUROPE/ADVANCED MATERIALS

MONTEDISON TO ENTER FIELD OF ADVANCED CERAMICS

Montedison/MER Joint Venture

Milan COMUNICAZIONE MONTEDISON in Italian Feb-Mar 86 p 8

[Text] Montedison and the American firm Materials & Electrochemical Research [MER] Corporation have signed an agreement to form a joint-venture company in the field of advanced ceramic materials.

The new joint-venture firm will be called the Keramont Research Corporation, will have its principal office in Tucson, Arizona, and will be engaged in research and development projects specifically targeted on the industrial production of specialized ceramic powders used in the most advanced applications, namely, in electronics and engineering.

Under the terms of the agreement, Montedison and MER will also form a unit for the production and sale of semi-finished ceramic materials for electronics.

Montedison's decision to invest in Arizona is part of the firm's program to enter the advanced ceramic materials sector both in Europe and the United States, creating a new base in an high-technology industrial sector that is today in a state of fast growth.

$30 Billion in 1990

Milan COMUNICAZIONE MONTEDISON in Italian Feb-Mar 86 p 8

[Text] Montedison's investments during the first 3-year period of activity are expected to come to some $10-15 million for productive projects at Tucson and for the fund that is to be dedicated to the new firm's research and marketing activities.

The memorandum of understanding was signed at Tucson where the Keramont Research Corporation will be adding its presence to that of other well-known companies like IBM, Hughes, and Garrett, which are already operating in the region on the development of advanced technologies.

In 1984, high-technology ceramic materials sales in the United States totaled $1.5 billion. According to projections compiled by Charles Rivers Associates in Boston, billings should total close to $4 billion by 1990, and some $15 billion by the year 2000.

At the world level, the size of this market should attain some $30 billion by the same date. Hence the growing interest on the part of many big international firms such as Cabot Corp., W.R. Grace, and General Electric.

Even greater interest is being shown by Japan, which considers ceramic materials to be one of the most advanced technologies developed during the past 10 years.

Montedison/Japan Approach Next

Milan COMUNICAZIONE MONTEDISON in Italian Feb-Mar 86 pp 8-9

[Text] Commenting on Montedison's joint venture with MER, Professor Renato Ugo of the Montedison Management Committee, said that it ties in with the Group's strategy aimed at penetration of the fast-growing marketing sectors, such as that of the "materials of the future," of which the ceramics sector is a significant example.

Montedison has defined a strategy in regard to product lines as well as geographical areas. It intends to operate in the field of ceramic manufactures and in that of powders, in specific sectors, some of which have already been identified and others are in the process of identification.

The entire strategy reflects an awareness that the sole key to success lies in a close tie with the end-user market.

In addressing the three principal markets (Japan, United States and Europe, in that order), Montedison's strategy has selected the United States and Europe as the first markets to be "served," leaving as a second order of business its approach to Japan, which, although the biggest market, is also technologically more advanced and more difficult to penetrate than the American market. As in the case of the fluoridated polymers, operating in a market for these products means having a productive base, and often a research base as well, in place.

The terms and conditions governing the project can be summarized in the form of four points:

--Creation of the Keramont Corporation at Tucson, a technological research and development venture within the sector, jointly with Materials & Electrochemical Research [MER] Corporation, which is scheduled to begin production this year;

--Forming of a company in Italy to coordinate all activities in the ceramic materials sector and to maintain ties with the Tucson-based Keramont Corporation;

--Ventures with other partners, already in a negotiating phase, in Europe;

--Intensification of the research efforts already under way at the Novara-based Donegani Institute, and currently targeted on technologies of the production of powders. This activity will be extended to include also the treatment and sintering phases of the powders and the physical and mechanical characterization of the manufactured products. Cooperation is also under way with the Massachussetts Institute of Technology [MIT] of Boston and other American and Italian universities.

PHOTO CAPTIONS

1. p 9. Among the leading uses of ceramic materials are sectors in which performance is a decisive factor, as in the aeronautical and racing automobile sectors, in which some advanced composite-materials components have already found use.

9399
CSO: 3698/465

WEST EUROPE/AEROSPACE

ESA DIRECTOR LUEST ON EUROPEAN, AMERICAN PARTNERSHIP IN SPACE

Hamburg DIE ZEIT in German 30 May 86 p 72

[Article by Reimar Luest: "Autonomy and Partnership--On European-American Cooperation in Space"; first paragraph is DIE ZEIT introduction]

[Text] Under the headline of "Always Following Your Nose," Anatol Johansen reported on the relationship of the European Space Agency (ESA) with the Americans in DIE ZEIT, No 19. His article presented the evaluation of German "experts." Reimar Luest, the director general of the ESA, rebutted this article. We then asked him to depict the policy of his agency, which must unite the interests of 11 countries, from his viewpoint.

The European Space Agency (ESA) is an example of the fact that the old continent can function as a unit if a clear political will is present. As a result of a 20-year united policy of its member states, ESA was able to develop the Ariane carrier rocket and to realize numerous satellite projects. The success of this space policy has demonstrated that the Europeans can keep pace in the area of peak technology vis-a-vis the Americans.

It was only logical for its research ministers, who met in January of last year in Rome at a conference, to resolve to extend Europe's independence and competitiveness to all areas of space travel and to independently assure access to manned space flight. Simultaneously, they gave the Americans a pledge in principle to participate in the international space station, which President Reagan invited the allies to help develop and build in 1983.

European independence is a goal which is politically enlightening. It is also uncontested that the competitiveness of European industry in the world market must be maintained or even improved.

As always in Europe, so do the jointly postulated goals of the ESA conceal very varied desires and motives of the individual member nations. However, with respect to the partnership in space travel sought with the United States, it was primarily three individually weighted considerations which played a role for the Europeans. They concerned politics, technology, and science.

From the political standpoint, the Europeans are confronted with the question whether they consider space to be so significant that they do not wish to

leave the opportunity to send men into space only to the Americans and to the Soviets. The response to this question cannot be given by scientists and technicians--they can only venture opinions as to whether such a project is meaningful from the standpoint of scientific-technical criteria. Participation in the space station is primarily a political question which necessitates a decision on the part of politicians.

The second political motive arises from the desire for transatlantic cooperation. The will of the Europeans to cooperate with the Americans, wherever this appears meaningful, is strongly formed and carries a political dimension which far exceeds the significance of the space program. But in the past it has been proven that spaceflight is an area in which European-American cooperation can be particularly fruitful to the extent that both sides benefit from it.

Seen from the technical standpoint, the desire to participate in the space station arises from the desire to participate in progress. To master the technology which permits a permanent presence of man in space opens up chances for European industry in capturing new markets. Secondly, the investigation of materials and technical processes in a state of weightlessness can lead to new fabrication or processing procedures on earth--and perhaps also in space. Although the path toward this end may still be long, as long as research in this area is still in its infancy and as long as the necessary preliminary work in investigation have not been accomplished, it would be less meaningful to prognosticate whether and when possibilities for new technological processes might present themselves.

Seen from the scientific standpoint, materials researchers as well as bioscientists will be offered an experiment platform by the space station in space which will facilitate hitherto impossible long-term experiments under conditions of weightlessness.

The motives of the Europeans for cooperation with the United States with respect to a space station are convincing. But are such criteria which would make European participation worthwhile fulfilled?

Let us remember: The entrance of Europeans into manned spaceflight is not just beginning. It was prepared on a long-range basis with the development and the construction of the manned "Spacelab" in which the FRG played a leading role. Entrance into this area was--and is still today--only possible because the United States made its space shuttle vehicle available. Europe still does not have a carrier for manned spaceflight. "Spacelab" has, in the meantime, made several spaceflights with the American space shuttle, among others in the fall of 1985, designated as German Mission "D-1." Impressed by the excellence of European development, NASA has funded construction of a second "Spacelab" in Europe.

It is the "Spacelab" development--extensively carried out in the FRG--which places the Europeans in a position of being able to react positively to the invitation of the American president to build an international space station. The Germans, supported by the Italians, took over the initiative and proposed

to their European partners in ESA that the space station participation be a program of the ESA under the title of "Columbus." In this manner, the space station became a part of the resolutions at the ministerial level last year at the conference in Rome.

Cooperation with the "Columbus" project gives rise to a number of difficult questions. And the major difficulties will probably not even be in the technical area. Scientists and engineers on both sides of the Atlantic are accustomed to working together. From the technical standpoint it is decisive that clear links in the cooperation are discernible. Depending on their essence, the links are divided into two sectors but simultaneously again join these. It will be much more difficult under the given conditions to find the appropriate legal framework for the construction and operation of the space station. What is decisive is whether European participation in a truly "international" space station can be legally assured over the long pull. But regardless of all technical and juridical questions which are yet to be solved, the value of this partnership will, in the long run, be determined solely by the political will of the participants, by the 11 ESA member nations, and by the United States.

The goal of European autonomy is completely compatible with the thoughts of partnership with the United States. Autonomy primarily means jurisdiction, particularly in those areas in which competition is useful and necessary. This is true not only for the application and marketing of space technology, as, for example, in the area of communications, but also with respect to basic research. Scientists must also compete against each other. It is equally important, however, that, where possible, they cooperate and that their results can be exchanged freely.

Autonomy means that Europe must go its own way in certain areas. This is true of communications satellites, but primarily with respect to further development of carrier capacities for the Ariane missile so that the United States should have no monopoly for access to space. This also includes the capability to bring men and materials back to earth from the space station. This is why the ESA should also develop the "Hermes" space vehicle proposed by France.

In contrast to the Europeans, the United States is autonomous and could execute all tasks it set for itself in space by itself. However, the Americans have permitted their autonomy to cost them something: The costs of the American space program are approximately eight times those of the Europeans for the same purpose.

These are facts which the Europeans must not forget in the question of autonomy and partnership with the United States. The way is still far toward European autonomy which must not remain a mere dream. It is not attainable on the first try. But a beginning has been made. Previously, Europe was not even the junior partner of the Americans in space; today, in the eyes of the Americans, it is an interesting "shareholder" who has proven his competence both in science and in the execution of difficult technical projects.

Some Americans must first become accustomed to this situation. One senses this with respect to the negotiations held with them regarding European participation in the space station. These discussions are being conducted both at the government level as well as between the ESA and NASA. Next spring is the decision time regarding the type of European participation. By then, it must be clarified whether European interests are protected in utilizing the space station. The Europeans must have the necessary decision authority for the operation and, finally, there must be clarity with respect to the financial framework, both for the developmental phase and for the operations phase. In contrast to the agreed-upon cooperation with respect to the Strategic Defense Initiative, the developments undertaken in Europe in support of the space station are being fully paid for by Europe--this means that the decision regarding technical developments is the responsibility of the Europeans, as is the decision about any possible subsequent alternative uses.

It was possible to conclude the first segment of the technical conceptual phase for possible European contributions by the end of March. As a result of these investigations, conducted by European industry, the plans have now been further specified.

Negotiations involving the Americans are still in their beginning stages. A true partnership will be again for both sides which exceeds the bounds of financial advantages. Consequently, one can look at the coming months with optimism as long as we Europeans act with clarity and in a united manner. European efforts to achieve autonomy and partnership with the United States are not excluded.

5911
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WEST EUROPE/AEROSPACE

PRC SPACE AGENCY SETS UP INFORMATION, CONTACT OFFICE IN FRG

Munich SUEDDEUTSCHE ZEITUNG in German 22 May 86 p 26

[Text] After careful deliberation, The China Great Wall Industry Corporation, which comes under the jurisdiction of the Chinese Ministry of Astronautics, has chosen Munich as the residence of its branch office for Western Europe. In the opening of this office, reference was made to the leading role of Bavarian industry in this field. This branch office, which will be manned by two representatives for the time being, is to aid above all in the exchanging of information and in cultivating contacts.

According to a representative of MBB [Messerschmitt-Boelkow-Blohm], "psychological setbacks" could be headed off better by this office. He was referring here specifically to the plan abandoned at the last moment by the Chinese side on commissioning a German consortium to construct a large nuclear power plant. The Chinese want to do business above all in the area of satellites, of which they have successfully shot 18 into space since 1980. Moreover, the launch-vehicle system Long March for satellite launches is to be introduced on the international market. Thus, next year two U.S. communications satellites will be fired into space. With that, the Chinese are closing the gap that arose because of an alarming series of explosions of American launch vehicles.

Last year, Bavaria imported goods worth DM 263 million from China. Goods worth DM 743 million were exported, which represented an increase of some 162 percent over 1984. With that, China found itself in 23rd place in the Bavarian export statistics.

12114
CSO: 3698/500

WEST EUROPE/AEROSPACE

BRIEFS

ITALIAN SPACE AGENCY TO BE CREATED--Rome, 7 April 1986--The Senate is preparing to enact into law the bill designed to institute the Italian Space Agency. According to this bill, the Agency is to implement a public-sector investment program with the principal aim of promoting the technological capabilities of our aerospace and electronics industry, not through generic grants in aid for research, but rather by financing targeted realizable projects of international interest, characterized by a high level of technology and risk. In addition, and in keeping with what other countries are doing that are involved in space activities, the Agency will be the official organization responsible for relations with similar foreign and international organizations. Funding for the instituting of the Italian Space Agency is to be budgeted in the amoung of 15 billion lire for 1986, and 35 billion lire for each of the years 1987 and 1988. [Text] [Rome TELEINFORMATICA 2000 in Italian 4-7 Apr 86] 9399

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WEST EUROPE/COMPUTERS

OLIVETTI BUYS TRIUMPH-ADLER, HOPES FOR BIGGER MARKETS

Duesseldorf VDI NACHRICHTEN in German 2 May 86 p 2

[Article by Manfred Gindle: "Olivetti Takes Over Triumph-Adler; European Solution for Bigger Shares of the Market; Results of Review by Antitrust Authority Not to Appear for a Few Months Yet]

[Text] Duesseldorf, 2 May--After a history of ups and downs, the VW subsidiary Triumph-Adler AG, Nuremberg, is being bought by Europe's largest manufacturer of computers and business machines, Olivetti, provided that no objections are raised by the Federal Antitrust Authority.

The chairman of the board of Triumph-Adler (TA), Wolfram Nadebusch, sees the takeover of his company by the largest European manufacturer of computers and business machines, C. Olivetti & Co. SpA, as a European move to combat Japanese competition. Nadebusch, who has been head of the company, until now a VW subsidiary, since 25 July 1984, hopes that the merger will enable it to participate in the growth of the business communications market over the long term, especially in view of the independence of the two brands.

And as a matter of fact, the market share in this sector for both companies together will be about 38 percent for Europe as a whole. The new German acquisition also has something to offer: about a third of the electronic typewriters in the Federal Republic of Germany are manufactured by TA.

The head of TA does not consider the German employees of the company, who currently number about 7,100 (about 11,000 worldwide) to be in any danger from the takeover, an opinion which is also shared by employee spokespersons. Instead, the main reaction to Olivetti's decision here is relief.

Whether, with its uneven history, the company will actually be able to maintain its independence over the long term, as a press release claims, is an open question. At Olivetti's headquarters in Ivrea it is emphasized that this is only the initial situation, which naturally will be reviewed in the course of time.

In addition, it is still unclear how much Olivetti is paying VW for its 98.4 percent interest in TA. Estimates start at about 400 million DM. VW itself had to come up with a substantially higher amount, 647 million DM, when it

purchased the Nuremberg firm in September of 1981. Added to that were an additional 818 million DM as compensation for losses.

Not a particularly good deal for the automaker, which never had any luck with its communications subsidiary. TA had 17,000 employees worldwide when VW took over the company from the American concern Litton Industries. But the trend was already apparent from the first balance sheet: the capital stock had decreased from 197 million DM to 89.2 million DM and the balance-sheet total was down 20 percent.

The then head of TA, Dr -Ing Peter Niedner, was able to get the comapny a solid start in the electronics market; the M 32 business communications system, one of the company's best-sellers at present, was created at that time. Ta nevertheless remained in the red last year. The losses were "considerably less than 1.1 million DM," however, a fact which was due to a 17 percent increase in sales, to 1.1 billion DM.

The new parent company is showing even more substantial growth. Last year the Olivetti Group was able to increase its sales by more than a third, to 9.37 billion DM, achieving profits of 769 million DM--41.5 percent more than in the previous year.

VW will own a 5 percent interest in the company. The Wolfsburg firm will have to pay about 600 million DM for this share in TA, which will make it the third-largest individual stockholder. However, in 1983, the U.S. communications company American Telephone & Telegraph (AT&T) was still able to acquire its 24.8 percent interest for 713 million DM.

Nevertheless, VW takes a positive view of both Olivetti's interest in TA, which could be increased to a maximum of 11 percent, and its takeover of the company. According to Horst Munzner, acting chairman of the board of VW, the very fact that AT&T stands behind the Italians could lead to innovations that his company would not have been able to offer TA. Furthermore, Munzner adds, in West Germany this takeover will provide some counterbalance to the dominant position of Siemens in the telecommunications field.

The takeover still has to be approved by the Federal Antitrust Authority in Berlin. It was learned from a spokesperson for the authority that it intends to give the merger a careful going-over. Since the boundaries of the market for electronic typewriters are especially hard to define, the spokesperson stated, the review of the merger will probably take up the legally allotted four-month period.

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WEST EUROPE/COMPUTERS

EUROPEAN MARKET FOR SOFTWARE SURVEYED

Milan INFORMATICA 70 in Italian March 1986 pp 38-40

[Text] During 1984 the European market for software and EDP services again posted further growth, approaching the value of $13 billion, up 20 percent over the previous year. This report is compiled from the annual survey, the ninth of the current series, conducted by the IDC [International Data Corporation], a well-qualified and known organization specializing in market research and consultation in the data processing sector, for the account of the ECSA [European Computing Services Association], whose membership is comprised of associations of national category (ANASIN for Italy).

France is the European country with the largest market share: Over $2.87 billion in 1984, while Italy, with a revenue of $1.535 billion, occupies fourth place; Italy's growth rate in this sector (21.9 percent) is almost 2 percentage points higher than the average (Table 1).

France's leadership is no longer surprising. For years now, France has been at the forefront of the continental stage of data processing services, a role it has defended and, last year, further consolidated, on the basis of three factors: Public-sector demand as an organic policy, financial and commercial strengthening of the sector's principal firms, and the forming of new firms that have contributed to keeping the sector dynamic. New opportunities of a technical and financial nature were opened, particularly in the areas of CAD/CAM/CAE, artificial intelligence and the management of data banks. Today, France is in a position to assure its industries of foreign outlets as well, where a still modest but already significant part of its production is being placed.

Germany's revenue was around $2.43 billion (with a growth rate of 20.4 percent over the previous year), reached at the conclusion of a particularly brilliant operating year and of a rapid rise in the demand for EDP services. The growing size of the software market--the report emphasizes--will have a notable impact on the structure of the EDP industry in the near future. Software firms and systems firms, in particular, will substantially increase their market share.

Table 1

Software and EDP Services Market in Western Europe - Dollar Values in Millions

	1983	1984	(1) Sviluppo %	(2) Svalutazione del $ 83/84
(3) Austria	206	248	20.4	0.897
(4) Belgio	366	437	19.1	0.855
(5) Danimarca	363	423	16.5	0.882
(6) Finlandia	274	327	19.3	0.927
(7) Francia	2.430	2.873	18.2	0.872
(8) Germania	2.018	2.429	20.4	0.896
(9) Gran Bretagna	1.704	2.080	22.1	0.881
(10) Irlanda	65	82	26.2	0.870
(11) Italia	1.112	1.355	21.9	0.863
(12) Norvegia	327	385	17.7	0.893
(13) Olanda	675	802	18.8	0.890
(14) Portogallo	32	39	21.9	0.751
(15) Spagna	296	366	23.6	0.889
(16) Svezia	479	571	19.2	0.927
(17) Svizzera	435	519	19.3	0.895
(18) Turchia	9	15	66.7	0.619
TOTALE	10.791	12.951	20.0	

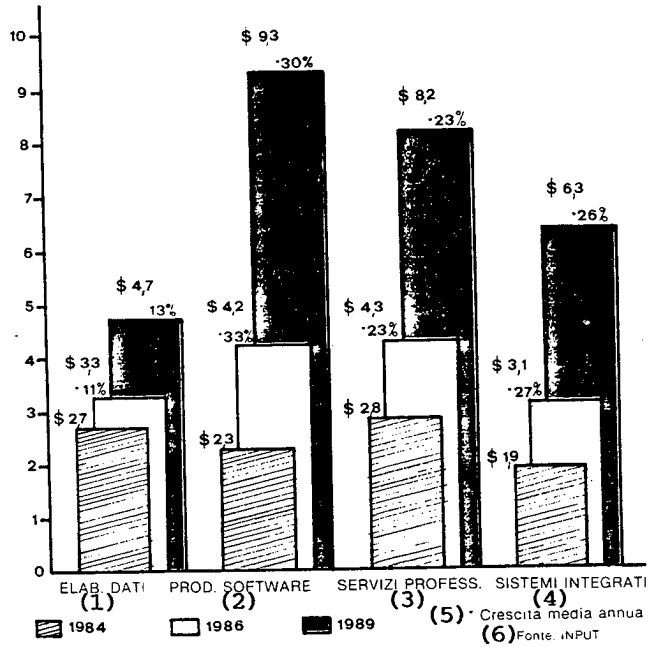
Note: 1983 market figures are based on 1984 dollar exchange rate for purposes of comparison.

Source: IDC/ECSA

Key:

1. Growth - percent.
2. 1983/1984 dollar devaluation.
3. Austria.
4. Belgium.
5. Denmark.
6. Finland.
7. France.
8. Germany.
9. Great Britain.
10. Ireland.
11. Italy.
12. Norway.
13. Holland.
14. Portugal.
15. Spain.
16. Sweden.
17. Switzerland.
18. Turkey.

Dollar Sizes and Percent Growth Rates of Data Processing Market in Europe (1984-1989) - Dollar Values in Millions



Key:

1. Data processing.
2. Software products.
3. Professional services.
4. Integrated systems.
5. *Average annual growth.
6. Source: INPUT.

Concrete indications are emanating from Germany, and being confirmed, moreover, by the experiences of other countries, of the growing importance of software for the microcomputer, the supply of which appears certain to spread rapidly.

In Great Britain, the computing-services market grew 23 percent. The recent period was characterized by a feverish buying and selling activity on the part of firms operating in this sector. One of the biggest operations was consummated last May with the takeover of SPL International by Systems Designers International, which also acquired an American firm, Warrington Associates, Inc., confirming the further interest surrounding the software and EDP services sector.

The market is being fed by three principal categories of suppliers: Hardware producers; system houses specializing, above all, in the design and installation of turnkey systems; and independent suppliers who sell primarily single products or services or combinations of these.

The products and services categories, into which the analysis is divided, are more numerous:

--"Package software," both system and applications, as a product designed to resolve an applicative problem, hence solution-oriented;

--Ad hoc or customized software and consultative services, to resolve a client's specific problems;

--Training, as a service purchased externally;

--Facilities management: As an adjunct to applications, each package tailored to the requirements of a single client;

--Processing services, supplied remotely or in local-batch form.

Table 2 illustrates the subdivision of the European market on the basis of this breakdown, which is substantially valid also for Italy (Table 3). The 2,370 billion lire at which the software and EDP services market is valued are made up of 575 billion in data processing services, of which approximately 770 billion are generated by local-batch and remote processing services [as published].

The survey takes into consideration and analyzes the results obtained from 50 firms that operate as suppliers of EDP services and software to third firms, which it breaks down by major sectors of activity, European billings, and overall world billings. The leader in Europe is IBM with billings of $260 million, although the number of employees dedicated to the support of this activity is not known. The second through fifth positions are occupied by four French firms (France is amply represented by 19 firms out of (50). Italy is represented among the top 50 European firms by a single firm: Data Management.

Table 2

1984 Software and EDP Services Market in Western Europe - Dollar Values in Millions

	1984	(1) Quota
(4) Produttori di hardware		
(5) Software confezionato	2.231	17%
(6) Software ad hoc/Consulenza	560	4%
(7) Subtotale	2.791	22%
(8) System house		
(5) Software confezionato	615	5%
(6) Software ad hoc/Consulenza	741	6%
(7) Subtotale	1.356	10%
(9) Venditori indipendenti		
(5) Software confezionato	1.161	9%
(6) Software ad hoc/Consulenza	2.382	18%
(7) Subtotale	3.543	27%
(10) Formazione	566	4%
(11) Gestione attività industriali	84	1%
(12) Servizi di elaborazione		
(13) Attività locali	1.526	12%
(14) Problem Solving Remoto	1.380	11%
(15) Remote Autotransaction	1.705	13%
(7) Subtotale	4.611	36%
Totale	12.951	100%

(16) Fonte: IDC/ECSA

Table 3

1984 Software and EDP Products Market in Italy

	(2) $/milioni	(3) Lire/miliar.	(1) Quota
(4) Produttori di hardware			
(5) Software confezionato	269	470	20%
(6) Software ad hoc/Consulenza	60	105	4%
(7) Subtotale	329	575	10%
(8) System house			
(5) Software confezionato	65	114	5%
(6) Software ad hoc/Consulenza	71	124	5%
(7) Subtotale	136	238	10%
(9) Venditori indipendenti			
(5) Software confezionato	98	171	7%
(6) Software ad hoc/Consulenza	287	502	21%
(7) Subtotale	385	673	28%
(10) Formazione	54	94	4%
(11) Gestione attività industriali	9	16	1%
(12) Servizi di elaborazione			
(13) Attività locali	221	386	16%
(14) Problem Solving Remoto	61	107	5%
(15) Remote Autotransaction	160	280	12%
(7) Subtotale	1.355	2.369	100%

(16) Fonte: IDC/ECSA

Key to Tables 2 and 3:

1. Share.
2. Dollars - millions.
3. Lire - billions.
4. Hardware manufacturers.
5. Packaged software.
6. Ad hoc software/consultation.
7. Subtotal.
8. Systems firms.
9. Independent sales firms.
10. Training.
11. Industrial activities management.
12. Processing services.
13. Local activities.
14. Remote problem solving.
15. Remote autotransaction.
16. Source: IDC/ECSA.

A second classification lists the 23 firms that produce a substantial share of their billings in-house within the group to which they pertain. Heading the list is Finsiel; in fourth position is Enidata; and in 15th position is Cerved.

Worthy of note is the fact that the European software industry still has very sparse links with the international market. The firms that realize a portion of their billings outside of Europe are still very few. The most foreign-oriented is the French firm Cap Gemini Sogeti: of $172.5 million in 1984 revenue, a little more than $46 million came from other than European clients.

[Box p 40] OCSE Study of Software Industry

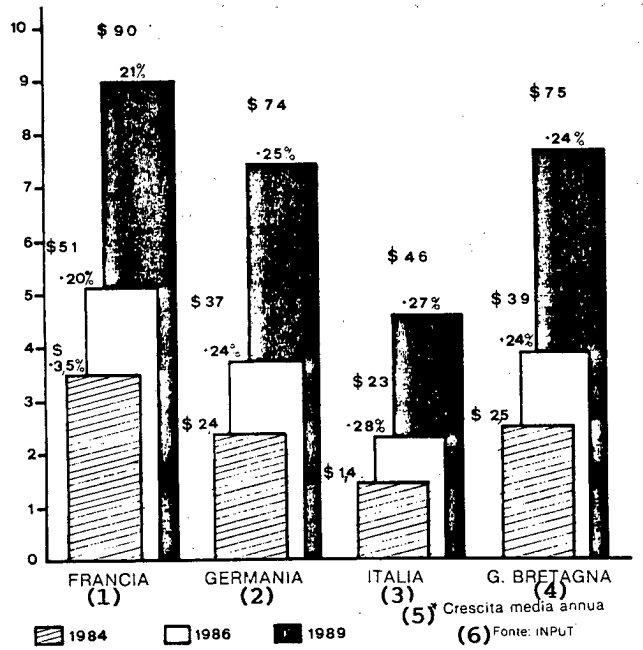
The OCSE [Economic Cooperation and Development Organization] has published a study of the software industry situation in which are described the appreciable particularities in the various member countries and the different state-sponsored activities designed to foster the growth of the industry. It points out the progress being made as a result of the introduction of programs designed to augment production from both the quantitative and qualitative standpoints. It also points out, however, that the software industry could be the bottleneck that is acting as a brake on the data processing industry as a whole. This consideration stems not only from the fact that software is the key to translating hardware progress into socio-economic advantages, but also from the fact that its development gives rise to serious technical and economic problems.

Software production--as is emphasized in a commentary published by Ibipress --is still very much of a craft, and its costs are therefore very high. The difficulty of automating it, owing to its typical nature as an intellectual product, and the tendency of firms to produce software designed purely for the purpose of in-house application, are the principal factors that limit the size of a market capable of absorbing products with more markedly industrial characteristics. At the same time, the lack of personnel fully trained to the point of professional qualification influences negatively both the producers and the users and, occurring as it does in the midst of rapid changes and a proliferation of programs, deepens the confusion of the potential user. Pointed up as a positive factor is the trend towards rationalization and an increase in investments, jobs and sales.

The software market among the OCSE countries, excluding each one's production for its own domestic needs, amounts to $35 billion. The United States accounts for 60 percent of the market, with 400,000 employees; Europe, 34 percent with 200,000; and Japan 15 percent with 50,000 employees.

The Ibipress commentary points out that the public bodies are striving to develop research, especially in the field of artificial intelligence applied to the development of software, and that, although the resources being

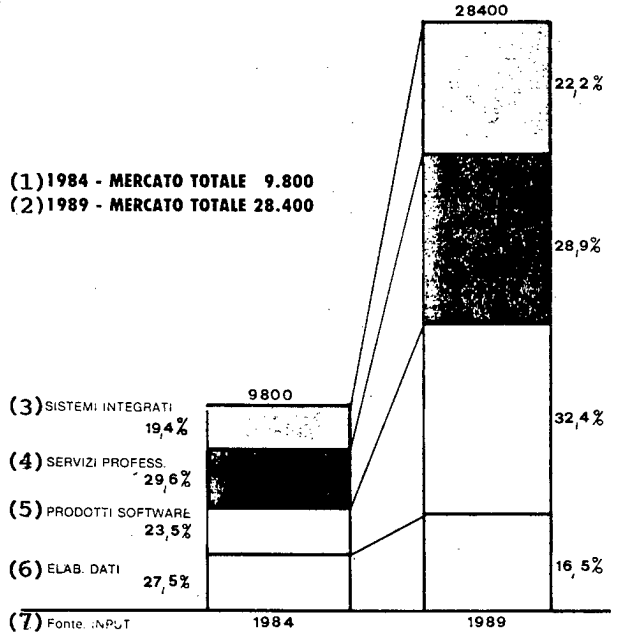
Size of Data Processing Services Market in France, Germany, Italy, Great Britain (1984-1989) (Dollar Values in Millions)



Key:

1. France.
2. Germany.
3. Italy.
4. Great Britain.
5. *Average annual growth.
6. Source: INPUT.

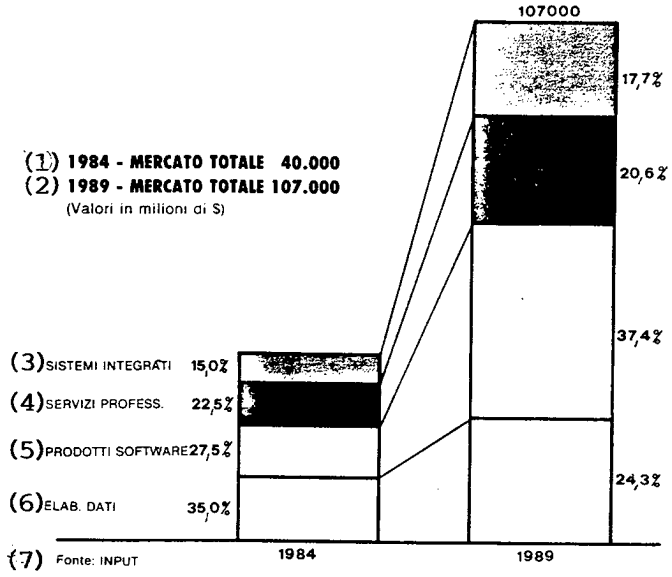
Structure of Data Processing Services Market in Europe - In Percentages of Total (Dollar values in Millions)



Key:

1. 1984: Total market $ 9.8 billion.
2. 1989: Total market $28.4 billion.
3. Integrated systems.
4. Professional services.
5. Software products.
6. Data processing.
7. Source: INPUT.

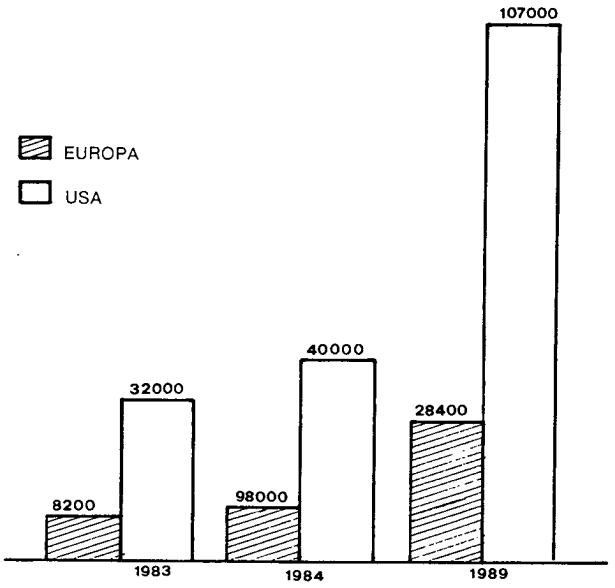
Structure of Data Processing Services Market
in United States - In Percentages of Total
(Dollar Values in Millions)



Key:

1. 1984: Total market $ 40 billion.
2. 1989: Total market $107 billion.
3. Integrated systems.
4. Professional services.
5. Software products.
6. Data processing.
7. Source: INPUT.

Size of Data Processing Services Market
in United States and Europe* (1983-1989)
(Dollar Values in Millions)



*INPUT defines Europe in terms of its principal countries (France, United Kingdom, Germany, Italy).

dedicated to this end are limited, there has been an improvement in the coordination of efforts and a training policy is being implemented in all the member countries--on an urgent basis in some--to close the gap that has developed to date.

The OCSE for its part recommends reaching a consensus among small and large manufacturers of hardware, software firms and users, with a view to converting the de facto standards imposed by the hardware manufacturers to de jure standards. As regards the international market, the OCSE actively opposes the support and the customs protection being given to each other's software firms. And it advises regulating the software trade on an international scale in ways that will facilitate interchanges and cooperative ventures and that will offer juridical protection to the software producers.

9399
CSO: 3698/465

WEST EUROPE/FACTORY AUTOMATION

WORLD'S LARGEST INDUSTRIAL ROBOT IN FINLAND READY FOR EXPORT

Helsinki HUFVUDSTADSBLADET in Swedish 10 Apr 86 p 16

[Article by Ulla Stenman: "Tammec Builds World's Largest Industrial Robot"]

[Text] Tammerfors--Tampella's turbine plant in Tammerfors has now completed work on the world's biggest industrial robot. The robot has been under development for 2 1/2 years at Tampella's automation unit, Tammec, and it was presented to the press on Wednesday.

The robot, which is 7 meters high, is used to polish water turbine blades, a stage of work that is hard and dangerous when it is performed by hand in addition to being time-consuming.

Tammec's managing director, Georg von Graevenitz, said that in addition to making the heavy polishing job safer, the robot also saves money by shortening the production timetable. Tampella buys the material used for casting the blades and the fine polishing usually takes 4-6 months. That time can be cut at least in half by eliminating many slow movements.

Export

According to von Graevenitz there is a lot of interest in the robot in other countries. Marketing will start this fall, with the first effort aimed at Scandinavia and the United States before worldwide marketing is attempted. Finished robots will cost 1-2 million Finnish marks, depending on equipment and design and there are hopes that around 10 robots will be produced per year.

At the present time 4 or 5 people are working on turbine polishing at the Tampella plant and none of them will become unemployed because of the robot. Several are needed to care for the machine and the others are being offered other jobs. Development of the robot has created 35 new jobs at Tammec.

The giant robot can move in six directions and its arm covers a work area 5 x 3.5 x 1.2 meters. The degree of precision required for polishing turbine blades is $\pm$ 0.5 mm for the entire area. The motors are direct current servomotors and the pulse generator serves as a measuring instrument. The robot

has been designed for heavy use in various work phases with big operating range requirements.

Main Control System

Tammec developed the main control system and its software which is attached to a conventional robot control device. The robot will later be attached to Tampella's turbine unite's CAD system, according to product development chief Leo Hakkinen.

6578
CSO: 3698/462

WEST EUROPE/SCIENTIFIC AND INDUSTRIAL POLICY

FRENCH FIM LOANS ACCUSED OF UNFAIR COMPETITION

Paris L'USINE NOUVELLE in French 20 Mar 86 p 45

[Article by Herve Plagnol: "The FIM on the Carpet"; first paragraph is L'USINE NOUVELLE introduction]

[Text] Accused of distorting the rules of competition, the Industrial Modernization Fund [FIM] has been censured by the European Community, a situation that will compel it to modify its procedures.

Is the FIM being threatened? This Industrial Modernization Fund set up in July 1983, has in any case just been blacklisted by the Commission of European Communities. The Commission reproaches the FIM for granting loans to companies with a rebate that disrupts the rules of fair competition between EEC countries. Thirteen company files are being scrutinized by the executive committee in Brussels: Two have already been subjected to an official inquiry (BSN [Boussois-Souchon-Neuvesel] and Perrier) and another 11 could follow (Renault, Valeo, PSA [Peugeot S.A.], Thomson, Radiotechnique, Bull, Merlin Gerin, Pechiney, Jaeger, Hutchinson, and Matra).

"An unfair action," answer in essence the officials of the Ministry of Industry. There are, according to the ministry, no rebates. If interest rates on FIM loans are low, it is because the price of the resource itself is low: about one-quarter of the total investment is obtained from the Codevi [Funds for Industrial Development]. True, responds the EEC, but those Codevi accounts are subject to tax exemptions for the savers which makes it possible to use lower interest rates.

The stakes are high. The FIM budget will be close to Fr 28 billion at the end of 1986 and will be used in the form of participatory loans or leasing contracts. So far nearly 10,000 companies have benefited, 80 percent of them small- to medium-sized companies, but those with more than 500 employees have absorbed 50 percent of the funds.

The European Commission intended to counteract this "deviation" because it believes that the conditions that make assistance justifiable (industrial restructuring, compensation for regional disadvantages, technological innovation) were no longer being taken seriously.

Two Attitudes Adopted

In actual fact the government will undoubtedly be obliged to modify the FIM procedure, entirely or partly, in order to avoid new reprimands. "What else can be done without denouncing the Treaty of Rome?," says a spokesman at ANVAR [National Agency for the Implementation of Research] where applications are processed.

For the companies applying for FIM loans, two attitudes have been adopted. One is optimistic and the other pessimistic depending on the growth of investments coming from Codevi accounts.

The optimistic attitude: Resources will continue to be abundant, enabling the FIM to obtain almost Fr 9 billion each year until the year 1988 or 1989 when loan repayments will equal new resources. In that case it will be sufficient for the FIM to make some "technical" adaptations to satisfy Brussels: more restrictive criteria for granting loans, observance of the conditions laid down by the EEC; routine modernization applications would face more difficulties to be eligible.

The pessimistic attitude: If savings resources dry up--as was feared several months ago before the savings boost which came as a "divine surprise"--the FIM runs the risk of disappearing. Indeed, the authorities can hardly be expected to take new fiscal measures or to lift the ceiling of the Codevi accounts to revive that resource. That would be provoking Brussels!

25039/9435
CSO: 3598/A108

RESEARCH MINISTER ON FRG CAPACITY, BUDGET, EUREKA ROLE

Improved R&D Abilities, Funds

Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German 17 Apr 86 p 7

[Article by Dr Werner Gries: "FRG Holds Outstanding Position Worldwide as Research Capacities Are Being Expanded"]

[Text] Federal Research and Technology Minister Dr Heinz Riesenhuber submitted a "1986 Report on Facts" as part of the "Federal Research Report" to the German Bundestag [Lower House]. This facts-and-figures report is a comprehensive reference tome containing statistics on Germany's research capacity. The figures given in Federal Research Report IV up to the year 1983 are now expanded up to the year 1985. In the following, we will supply some indicators from the wealth of data that will describe the country's research capacity.

The FRG's research expenditures rose from DM36.1 billion in 1979 to DM46 billion in 1983. For the years 1984 and 1985, we have preliminary estimates and they show that Germany's research expenditures in 1985 came to DM52.2 billion, compared to DM48.8 billion in 1984. The total research and development budget in the FRG is shown in Table 1.

The biggest contribution to the financing of research expenditures in the FRG comes from the economic sector. Its share rose from 53.3 percent in 1979 to 58.9 percent in 1983. Data available for 1984 and 1985 confirm this trend. The share of the other domestic sectors on the other hand declined.

We must distinguish between the financing of research expenditures and of research in the various sectors, such as industry, advanced schools, or foreign countries. As far as industry is concerned, it is financing, for example, DM29.7 billion in research funds but is actually handling DM36.7 billion, in other words, in-house financing of FRG industry financing was 81 percent in 1985. The remaining 19 percent can be distributed over the civilian research allocations from the federal government (10.6 percent), defense research (6.8 percent), and miscellaneous, especially foreign countries (1.6 percent).

Here we must stress the increase in the number of research personnel in industry with about 380,000 persons (full-time employees); that includes 35.3 percent

researchers, 31.6 percent technical personnel, and the rest are administrative employees. We do not as yet have any more recent data from the industry sector for the years 1984 and 1985. The trend is similar as in the case of research expenditures but it is on the increase.

As we can see from Table 1, the federal government and the federal states in 1985 made a contribution of about DM20.6 billion to the financing of research expenditures in the FRG and that came to 39.5 percent. The comparable share in 1979 was 44 percent. This figure alone already shows that the influence of the federal government in the financing of research and development has been declining. This was partly due to indirect research promotion, which has been stepped up of above all in recent years, and the federal government's reticence in the case of research expenditures. Federal research and development expenditures which in 1979 and during the years thereafter were still increasing quite considerably were raised only moderately starting in 1983. This trend continued in 1984 and will be expresed even more drastically in 1986 due to the federal government's economizing measures with respect to budget management. As for the civilian promotion sectors, a figure of DM10.7 billion has been estimated within the federal government for the year 1986, compared to DM10.6 billion in 1985 and DM9.7 billion in 1984. In the area of the federal government, above all those research sectors recorded an expansion in recent years in which the State's original desires are expressed, in other words, defense research and technology or sectors in which the market forces are present only to a minor degree (aviation research and space research). In contrast to many assumptions, industry-related technology promotion by the federal government is going down. This can be seen in Table 2. This structural change in research promotion also has consequences regarding the promotion of basic research. Out of the DM11.6 billion made available for research expenditures by the federal government in 1984, DM3.1 billion or 26.9 percent went to basic research. In the Research Ministry, the share is even as high as 35 percent. By comparison, the percentage in 1980, for example, was 24.2 percent.

The DM36.7 billion in research expenditures transacted by industry in 1985--of which industry financed DM29.7 billion itself--consist of 84 percent for the three sectors of the chemical industry, the steel, machine-building, and vehicle construction industry, as well as electrotechnology, precision mechanics, and optics. In 1983, about 3 percent of the sales volume of the enterprises were spent on research and development (1981: 2.8 percent). The subsector of electrotechnology is particularly research-intensive with 7.6 percent and the chemical industry subsector shows a figure of 4.4 percent. There is a series of government promotion measures that are illustrated in detail in the 1986 Report on Facts. As we said earlier, these manifold government promotion measures do not result in any dependence of German industry on government research promotion. The promotion of civilian R&D for the manufacturing trades came to DM4 billion within the federal government in 1984 and that included DM630 million in tax benefits for investments and special writeoffs in R&D. Within the various federal government research measures, small and medium enterprises and industrial cooperative research assume outstanding significance. The share of the smaller and medium enterprises (enterprises with up to 500 employees) out of the federal government's expenditures for civilian research and development of industry as such is between 25 and 29 percent, depending on the base year. This is interesting because, in this way, the small and medium enterprises get almost twice as

much in the way of funds from federal aid as they themselves contribute, percentage wise, to industry's research expenditures. This means that the small and medium enterprises are getting a disproportionately large amount of aid. If we keep in mind that, in the case of direct project promotion by big enterprises, a considerable part of the funds is again passed on to small and medium enterprises, although this does not stand out in statistical terms, then we cannot speak of any disadvantagement of the small and medium enterprises when it comes to research support.

Looking at an international comparison, the FRG holds a leading position in research expenditures. This is expressed by a share of about 2.6-2.7 percent of the gross R&D domestic expenditures out of the GDP and the high per-capita R&D expenditures as well as the number of research personnel. Here however it is interesting to note the difference in research financing in the various Western industrial countries, especially regarding the significance of state research allocations. In the United States, France, and Great Britain, military R&D plays an important role but that is of subordinate significance in Japan and the FRG.

By way of summary, we can say that German industry is stepping up its own R&D efforts and that the government is holding back. In the light of an international comparison, the FRG holds an outstanding position in R&D. This means that the prerequisites for coping with international competition do exist. Whether and to what extent the research results will also be expressed in products and production methods, that is another question.

Total FRG R&D Budget

FRG R&D Expenditures by Financing Sectors and in Relation to GNP

Finanzierende Sektoren[1] (4)	1979	1981	1983	1984	1985
I. Bund[2] – Millionen DM (5)	10 026.00	10 283.00	11 314.00	11 623.00	13 085
Index 1979 = 100	100.00	103.00	113.00	116.00	131.00
in Prozent der FuE-Gesamtausgaben (6)	27.70	25.30	24.50	24.00	25.00
II. Länder[3] (einschl. Gemeinden) – Millionen DM (7)	5 914.00	6 707.00	6 883.00	7 200.00	7 600.00
Index 1979 = 100	100.00	113.00	116.00	122.00	129.00
in Prozent der FuE-Gesamtausgaben (6)	16.40	16.50	14.90	14.90	14.50
III. Wirtschaft – Millionen DM (8)	19 250.00	23 054.00	27 197.00	28 880.00	30 780.00
Index 1979 = 100	100.00	120.00	141.00	150.00	160.00
in Prozent der FuE-Gesamtausgaben (6)	53.30	56.70	58.90	59.60	58.90
IV. Private Institutionen ohne Erwerbszweck (PNP)[4] Millionen DM (9)	340.00	207.00	184.00	200.00	200.00
Index 1979 = 100	100.00	61.00	54.00	59.00	59.00
in Prozent der FuE-Gesamtausgaben (6)	0.90	0.50	0.40	0.40	0.40
von inländischen Sektoren finanzierte FuE-Ausgaben insgesamt Millionen DM (10)	35 530.00	40 251.00	45 578.00	47 903.00	51 665.00
Index 1979 = 100	100.00	113.00	128.00	135.00	145.00
in Prozent der FuE-Gesamtausgaben (6)	98.30	99.10	98.80	98.80	98.90
in Prozent des Bruttosozialproduktes (11)	2.50	2.60	2.70	2.70	2.80
V. Ausland – Millionen DM (12)	610.00	386.00	575.00	575.00	575.00
Index 1979 = 100	100.00	63.00	94.00	94.00	94.00
in Prozent der FuE-Gesamtausgaben (6)	1.70	0.90	1.20	1.20	1.10
VI. FuE-Gesamtausgaben – Millionen DM (13)	36 140.00	40 637.00	46 153.00	48 478.00	52 240.00
Index 1979 = 100	100.00	112.00	128.00	134.00	145.00

[Footnotes]: (1) partly estimated, on basis of actual figures until 1983; (2) federal government research installations as o 1981, federal state research installations as of 1983 only with R&D shares; (3) in particular, scientific installations (financed from in-house revenues) that are financed overwhelmingly by the State.

Key:
4. Financing Sectors (1)
5. Federal Government (2), millions of DM
6. Percent of Total R&D Expenditures
7. Federal States (2), Including Communities, Millions of DM
8. Industry, Millions of DM
9. Nonprofit Private Institutions (3), Millions of DM.
10. Total R&D Expenditures Financed by Domestic Sector Millions of DM
11. Percent of GNP
12. Foreign Countries, Millions of DM
13. Total R&D Expenditures, Millions of DM.

Source: BMFT [Ministry of Research and Technology]

Expenditures in Billions of DM

Jahr (7) / Förderbereich (8)	Ist 1982	Ist 1983	Ist 1984	Soll 198
1. Wissenschaftliche Grundlagen	2076	2209	2336	24
2. Staatliche Langzeitprogramme	955	938	1077	11
3. Vorsorgeforschung	1420	1468	1482	16
4. Wirtschaftsbezogene Technologieförderung	4538	4080	4026	43
5. Infrastruktur, Rahmenbedingungen	820	780	743	9
6. Wehrforschung, Wehrtechnik	1667	1838	1959	25
Gesamt (9)	11476	11314	11623	130

Key: 1. Scientific Foundations
2. Long-term Government Programs
3. Contingency [Precautionary] Research
4. Industry-related Technology Promotion
5. Infrastructure, General Conditions
6. Defense Research, Defense Tehnolo
7. Year
8. Promotion Sector
9. Total

Ist--Actual Figures; Soll--Target Figures.

Increasing Industry Share Urged

Duesseldorf VDI NACHRICHTEN MAGAZIN in German Apr 86 pp 18-19, 21

[Interview with Federal Research and Tehnology Minister Dr Heinz Risenhuber: "EUREKA--Initiative Must Come from Below"]

[Text] Initiated almost exactly a year ago on 15 April in a letter from French Foreign Minister Dumas to Federal Foreign Minister Genscher, it was especially the European high-technology research program called EUREKA [European Research Coordination Agency] that raised hope for ending "Eurosclerosis" which had been so extensively covered by the American media. In the meantime, 18 European countries have begun to participate in EUREKA; on 5 and 6 November of last year, their research and foreign ministers, meeting in Hanover, agreed on issuing a declaration of principle for this undertaking and gave the "go-ahead" for ten specific projects. The next meeting of this group is scheduled for May in London. EUREKA became a political success in a very short time and there is hardly any further talk about Eurosclerosis. Federal Research Minister Dr Heinz Riesenhuber is confident that EUREKA has "launched a thematically broad-based search process for worthwhile possibilities of cooperation" which "leaves the actual agents of tehnological development, in other words, the industrial enterprises and the research installations, a maximum measure of freedom, imagination, and talent for combination." If everything

turns out the way the inventors of EUREKA hope it will, then much will be set in motion with little in the way of financial resources and it appears extremely nice that the program's demanding goals are to be attained with unbureaucratic methods of decision-making and coordination. This is considered to be "typical of EUREKA," commented the federal research minister.

VDI-NM [Association of German Engineers-News Magazine]: EUREKA is a politcal success and that is proved by the conference of ministers of 18 European countries, alone, in Hanover in November of last year, as well as the interest expressed by other, third countries, to participate in EUREKA. Is there any way of telling when EUREKA will also become a technological success?

Riesenhuber: EUREKA's political success was indeed expressed by the fact that 18 European countries and the ECC after a very short lead time agreed on a general framework for technological cooperation and thus discovered and aroused strong new interest in the industry and science of the participating countries as well as in other countries, far beyond Europe. Technological success will certainly be expressed by the results of this cooperation, in other words, at the moment when the first projects, which are now being started and which in most cases will run for several years, attain their goal.

VDI-NM: EUREKA has created high expectations, especially since it is often treated in public as a European alternative to the American SDI Program. Is there a danger that the expectations that have been tied to EUREKA are too high and that they will thus endanger success?

Riesenhuber: We never viewed EUREKA as a European alternative to or competition with SDI. EUREKA's completely different character is quite obvious. Apart from that, there have also been doubts and criticisms from various quarters in addition to the rather high expectations. But I am sure that these reservations will be refuted by the results of the cooperative effort triggered by EUREKA.

VDI-NM: It has been said that EUREKA is "still nothing more than an empty word." People claim that it is difficult to have any specific concept as to what EUREKA really is. How does the federal research minister dismiss such prejudices?

Riesenhuber: The Hanover conference of ministers not only created the framework for cooperation through its declaration of principle but, at the same time, already submitted a list of, at any rate, ten cooperation projects. General agreements are a necessary foundation, cast in the form of words, for such far-reaching cooperation but specific individual steps are adopted only very rarely at the same time, as has been done in the case of EUREKA. The initial substance to be injected into this originally somewhat empty word was supplied at the same time and additional supplies will follow shortly.

VDI-NM: Another opinion on EUREKA which one can hear often goes something like this: "The whole thing is a political storm in a teacup. Because the State is hardly investing any additional funds in EUREKA, there will be basically nothing more than nice words. Whatever is being done under EUREKA would have to

be done anyway." Is there a danger that EUREKA might really become nothing more than an empty word?

Riesenhuber: Something that "would have to be done anyway" is in fact not always being done. And, quite naturally, important and, in this sense, also necessary things are to be tackled under EUREKA. I could thus reply with the following counterquestion: If something is necessary, why should one not strive to achieve it through EUREKA?

Typical of EUREKA is the determination to work through unbureaucratic cooperation so that, in the individual case--in comparison to a possible national go-it-alone effort or a conventional R&D program by an international organization characterized by requirements for unanimity--the economic effect of division of labor and cost-savings will certainly materialize. The projects adopted in Hanover show furthermore that, along with the determination to have cooperation, there was also from the very beginning the intention of mustering the necessary funds. The federal chancellor emphasized this particularly during his opening address at the conference of ministers in Hanover.

VDI-NM: The conference of foreign and research ministers in Hanover agreed on a declaration of principle which stresses the civilian character of cooperation. What is it actually that works against the inclusion of military projects?

Riesenhuber: The agreement you mentioned has a very plausible background: the productivity and competitive capability of European industries and national economies are to be increased with the help of EUREKA. This calls for a concentration of performance capacity from all market-economy oriented countries in Europe that have a certain industrial potential. EUREKA also includes countries that do not cooperate in military alliances, such as Austria, Switzerland, Sweden, and Finland. Military projects would have a different context and, last but not least, would require the decisive conceptual and financial participation of the particular defense ministers.

VDI-NM: Ten EUREKA projects were adopted jointly. The list of projects extends from the development of a high-performance laser system via the development of a vector computer all the way to medical diagnosis systems. Now, you, Minister Riesenhuber, are always pleading for the kind of cooperation that would be as unbureaucratic as possible. But does not the compulsion for stronger coordination arise not only from the different nature of the projects? After all, the acronym EUREKA is derived from "European Research Coordination Agency."

Riesenhuber: No, not really. The different character of the projects springs from the fact that the initiative for individual projects does not come from "topside," in other words, from the government, but rather from enterprises or research installations that are willing to cooperate. The projects are not interconnected and to that extent they cannot be coordinated with each other. Coordination within a project again takes place through the participating enterprises and research installations themselves.

An "agency" by the way is no longer being demanded by any of the partner countries so that the agency you mentioned as being derived from an acronym is actually outdated. To be sure, fast and uniform flow of information between

the partner countries appears necessary and this is why the establishment of a small secretariat was adopted in Hanover.

VDI-NM: If there is to be such an institution, will we know, after the coming conference of ministers in London, what it will look like?

Riesenhuber: I would certainly assume so. There is agreement to the effect that no huge, cumbersome machinery is to be created here; instead, what is wanted is a small working staff of less than ten people who will serve as information routing agency in the preparation and implementation of the projects.

VDI-NM: How can the small European countries effectively bring their interests to bear? Will they be accepted as "full members" in the "EUREKA" club?"

Riesenhuber: The so-called "small European countries" were accepted and even invited from the very beginning as full members of the "Club," in other words, the conference of ministers and the group of high-ranking representatives. Just like the larger countries, they will be represented by their own representatives in the secretariat. They can also at any time, like all other countries, submit project proposals. There are also projects which will attain their full significance only through the participation of as many countries as possible. That applies above all to those undertakings which are aimed at Europe-wide infrastructure installations or the solution of problems that cross international boundaries. Here are some examples: the "European Research Network" Project which we proposed in Hanover produced an extraordinarily broad echo already there. In the meantime, it is the hitherto only undertaking in which all of the 18 participating countries and the ECC are participating. Using the public telecommunications networks, computer installations of advanced schools and of government and industrial research installations are to be so connected with each other that the exchange of data, computer programs, and information between researchers will become possible on a Europe-wide scale. It would seem that the smaller countries would, if anything, profit more from the data collections in larger countries than the other way around.

Another example is the "EUROTRAC" Project which is designed to measure and analyze the transport and conversion of noxious substances in the air over Europe. Here again there is a whole series of small countries that are participating.

Among the industrial projects likewise there have already been several smaller countries that indicated their cooperation in Hanover. This will be continued in relation to the projects currently being prepared. Considering all the differences in the industrial potentials and individual interests, there are by no means just two classes of partner countries. The declaration of principle came about through the cooperation and approval of all countries; they will seek and find their particular role also in the case of the projects. By the way, one should never judge the significance of a country's R&D installations by the size of that country; there are enough examples of outstanding and great scientific-technological institutes and enterprises in the so-called "small" Western European countries.

VDI-NM: What are the projects of which we can most likely expect that synergy effects will materialize in the since of EUREKA?

Riesenhuber: The characteristic feature of all EUREKA projects should be that international cooperation should offer advantages in terms of implementation. This is an essential criterion for the support and promotion of undertakings with German participation. International cooperation is not an end in itself as far as we are concerned; the advantages arising from that must justify the necessarily attendant additional expenditure.

This is certainly true regarding the high-performance laser development project which was decisively determined by us and, as regards the previously mentioned "EUROTRAC" and "European Research Network" projects, the advantages are quite obvious for the reasons given earlier. The same applies to projects which, along with development work, are aimed at product standardization, such as, for example, the project of a personal computer for use in education.

VDI-NM: What incentives does EUREKA offer the small and medium enterprises in terms of their participation?

Riesenhuber: The attraction lies in the fact that they can offer their own contributions within major interconnected projects and through this participation they can attain or maintain a link to major developments. Even though major enterprises will be involved in such cases most of the time, the difficult problems create the need for falling back on specialized smaller enterprises. In the case of demanding, complex new development, such as, for example, the laser project, we need a broad range of differing contributions, including basic research in advanced school institutes and large-scale research installations as well as special skills offered by small and medium enterprises.

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WEST EUROPE/TECHNOLOGY TRANSFER

MONTEDISON SIGNS $100 MILLION CONTRACT WITH CZECHOSLOVAKIA

Milan COMUNICAZIONE MONTEDISON in Italian Feb-Mar 86 p 13

[Text] The Czechoslovak agency Chemapol and the Montedison Group have signed a commercial 5-year agreement in the Czechoslovak capital, covering the mutual supplying of chemical products and having an overall value of over $100 million. The agreement, which is coupled to the new Czechoslovak 1986-1990 developmental plan, was signed, for Montedison, by its managing director, Giorgio Porta, and, for Chemapol, by Director General Zdenek Mojzisek. On the basis of the contract, the Italian Group will sell to Chemapol mainly petrochemical, chemical and pharmaceutical products and intermediates for dyes; it will import from Czechoslovakia petrochemical, chemical and various intermediate products needed to complete its own specific products.

The signing of the agreement provided an opportunity to examine in detail the entire sector of bilateral relations, including agreements of a scientific and industrial nature. Porta was received by the federal deputy premier and head of the State Commission for Science, Technology and Investments, Jaromil Obzina, and subsequently had talks with the federal deputy premier for foreign trade, Jaroslav Jakubec, and then with the Czechoslovak deputy premier for industry, Jiri Marcin.

During these talks, Montedison's managing director referred to the fact that the Montedison Group's imports from Czechoslovakia represent more than one-third of Italy's entire chemical imports from that country. Furthermore, the Montedison Group's exports to Czechoslovakia amount to more than half the entire Italian export. The most important point, however--Porta pointed out--is that the interchange is tending to shift towards an increasingly diversified and technologically qualified gamut of chemical products. Contributing to this is the effective technical and scientific cooperation taking place between the two parties in sectors such as plastic materials, pharmaceutical products, biotechnologies, and data processing.

In Prague, Porta also held a conference with over a hundred representatives of the political, academic, scientific and industrial worlds. He outlined

the importance and the new peculiarities of the chemical sector in the world economic context, citing the forecasts relating to its growth and principal structural changes. The speaker then cited the three fundamental factors that can assure the chemical firms of solid growth: Technological innovation, internationalization and diversification, the latter being the element that enables entry into market niches potentially bound for growth, and the sharing of the risk involved in every single business venture.

Porta emphasized that in a system in which markets are no longer national but rather worldwide, in which technological development involves the pooling of capacities, human resources, and financial resources, and in which the processes of rationalization are not concerned with single firms but rather with entire systems, the need and the intent are growing to find a viable integration between competition and cooperation.

The managing director concluded his remarks affirming that Montedison has long since made this its philosophy and that the Italian Group's commitment to the developing of specific agreements and basic agreements with countries in geographically and economically diverse areas as well, and in particular with the Comecon nations, remains constant and ongoing.

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WEST EUROPE/TECHNOLOGY TRANSFER

SWEDEN TO GET EUREKA LEADERSHIP, GREATER RESPONSIBILITIES

Stockholm DAGENS NYHETER in Swedish 14 May 86 p 11

[Article by Olof Dahlberg]

[Text] Beginning with the second half of the year and continuing for 6 months thereafter, Sweden will preside over Eureka, the European high-technology cooperation project. Sweden will succeed Great Britain in the chairmanship at a ministerial conference in London on 30 June.

Eureka was launched in Paris a year ago on the initiative of French President Francois Mitterrand. So far, Frenchmen, Germans, and Britishers have occupied the chair in succession. The fact that Sweden is now getting the post after those three leading countries on the continent must be viewed as proof of how highly people around Europe regard active Swedish participation in their cooperation.

"The chairmanship is not just an honorary position. It involves active responsibility for seeing to it that the entire Eureka idea moves forward," says Ulf Sviden, first secretary at the Ministry of Industry. "Cooperation in Eureka has gathered a degree of momentum and now comprises about 80 projects."

Euphoric Phase

The purpose of the Eureka project is to counterbalance the rapid American and Japanese advance in the field of high technology. But after an initial phase of French euphoria in the spring of 1985, early progress was slow.

Ulf Sviden says: "We have the impression that there is now a quite sizable interest in Eureka around Europe. But Swedish industry still seems rather lukewarm toward the idea."

No Bloated Bureaucracy

Ever since Eureka was launched, the EC Commission has displayed a degree of opposition. The fact that Sweden is now getting the chairmanship is something of a defeat for the EC's bureaucracy in Brussels. At the same time, it means that the pan-European dimension of cooperation in Eureka is being stressed.

At the ministerial conference in London, a decision will be made to establish a small secretariat for Eureka. That secretariat is not to be another bloated bureaucracy: it is to consist of only seven people appointed to keep track of the various projects.

It is not yet clear where the secretariat will be located, but in all probability, the choice will be Brussels. The French and Germans have been advocating Strasbourg, but have not persuaded more countries to go along with the idea.

At the end of this year, a big ministerial conference on Eureka will be held in Stockholm with participation by the 18 participating countries.

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WEST EUROPE/TECHNOLOGY TRANSFER

FINNISH COMPANIES PARTICIPATING IN EUREKA

Helsinki HUFVUDSTADSBLADET in Swedish 10 Apr 86 p 13

[Text] Five or six Finnish companies are expected to participate in a total of around 80 different projects within the framework of the European high-technology Eureka program. Some 68 different projects are already in the planning or starting phase.

This information was provided by the head of the Technology Development Center, Juhani Kuusi, at a press conference Wednesday in connection with the current visit to the center by a French delegation led by the chief coordinator of the French Eureka project, Yves Sillard. The Technology Development Center functions as Finland's coordinator for the Eureka projects.

One of the reasons for the French visit was to give interested Finnish company leaders an opportunity to obtain direct information on the Eureka program and another was to present Finnish companies and outline cooperation opportunities to the French visitors.

It is already clear that Nokia and Vaisala will take part in the Eureka program. Juhani Kuusi would not elaborate on which other companies might be involved.

The companies themselves seek cooperating partners within the Eureka framework and they are also the ones who report their involvement.

According to Yves Sillard, electronics, biotechnology and shipbuilding offer promising cooperation possibilities.

With regard to financing the projects Sillard said that it is meaningful for companies to take responsibility for a substantial part of the costs. Then the respective national governments can decide how much they want to invest out of general funds.

No Expansion Planned

Sillard also explained that there were no plans to increase the number of participating countries beyond the 17 already included in the program and the

EC Commission. There has been a great deal of outside interest. Canada, Argentina, India and China have expressed an interest in participating in the program.

However Sillard said it was possible that individual companies from non-participating countries might be allowed to take part in individual projects.

Yves Sillard stressed the fact that Eureka has a civilian orientation. He saw no relationship at all between Eureka and the controversial American Strategic Defense Initiative, SDI. However SDI could have high-technology side effects that would be of interest to European civilian research.

With regard to Eureka's possible future combination with military efforts, Sillard simply said that if a decision is made 5 or 10 years from now to build a European space defense system, it will be easier to do so due to the experience gained from the Eureka program than would otherwise have been the case.

6578
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WEST EUROPE/TECHNOLOGY TRANSFER

SWEDISH VIEWS ON TECHNOLOGY SALES, EXPORT CONTROLS

Tighter Rules, Harder Control

Stockholm SVENSKA DAGBLADET in Swedish 28 Apr 86 p II

[Article by Eva Adauktsson and Bjorn Suneson: "Harder to Export Technology"; first paragraph is SVENSKA DAGBLADET introduction]

[Text] It will become increasingly difficult for Swedish firms to export products containing American technology. Today the American Department of Commerce requires export licenses for over 100,000 products and technologies. Last week the rules for distribution licenses were tightened up and starting on 1 June it will be illegal to export American technology without permission from the United States. Both large and small companies are uneasy about the harder rules but they are forced to comply with them in order to be able to buy the technology. Several articles in SVENSKA DAGBLADET will show how the tighter controls affect trade.

"There have always been export controls on trade between various countries." So said Brooks Ohlson, export control attache at the U.S. Embassy in Stockholm.

Whether or not this is the case, more and more Swedish firms are being forced to understand the importance of export controls.

American electronics plays an important role in Swedish industrial production. Technologies subject to American export controls have been used in a growing number of areas and they are often central components in Swedish export products.

Tighter Rules

The deals and technology smuggling incidents of recent years where Sweden has been used as a transit country for re-export to East bloc countries have also led the Americans to tighten their regulations.

The Americans say that the background for export control is a desire to protect vital American interests. The precipitating factor was the Soviet invasion of Afghanistan in December 1979.

The basis for the export control system is that certain goods and technologies cannot be exported to certain countries without special permission.

Depending on the products involved, exporters apply for an export license from the Export Administration. When importing goods to Sweden, the importer and in some cases the user must fill in documents related to the use of the product and pledge compliance with export control rules.

When a product is to be shipped from the United States and then re-exported to another country the American exporter must apply for a re-export permit.

Forbidden by Law

In the past Sweden has not had any technology laws and thus it was not regarded as illegal to smuggle technology to the East. As of 1 June Sweden will have an ordinance that forbids certain types of export without American authorization.

The American Department of Commerce is the authorizing agency. The control list is very extensive. At present it includes around 200 categories of goods and technologies and covers more than 100,000 specific products and technologies and where export licenses are required. Currently the Export Administration receives almost 130,000 license applications a year.

Export control covers the following:

The export of goods and technical data from the United States.

The re-export of American goods and technical data from one country to another.

The export and re-export from one country to another of foreign products that contain American components.

The export and re-export from one country to another of foreign products produced with the help of American technical data.

Libya Blacklisted

Each country outside the United States is placed in a group of countries designated by a letter. In most cases one can determine from this the level of U.S. export control. Two extremes can be given as examples, Canada and Libya. No export license is required for shipments to Canada except for very advanced equipment, while Libya is virtually blacklisted.

Compliance with U.S. Requirements Necessary

"We cannot acquire American technology by force. If Swedish companies want it they must also abide by the conditions that are imposed." So said Carl-Johan Aberg, undersecretary with the Foreign Ministry's trade section in Stockholm.

Technology policy as a whole is a very sensitive issue. Swedish industry depends on American technology. The United States imposes high requirements on Swedish firms and reserves the right to investigate them and conduct audits in Sweden. But this does not affect Sweden's status as a nonaligned nation, according to Carl-Johan Aberg.

Technology Smuggling

"We noted several years ago that Sweden was becoming a transit country for technology smuggling. That was when our nonalignment was threatened. That is why the government felt it was necessary to take this new step to prevent this kind of unhealthy traffic."

Carl-Johan Aberg said that Swedish firms have no possibility of competing with American firms in all areas as far as high technology is concerned.

"Our country is simply too small to allow us to get by on our own. But we participate actively in European cooperative efforts and we keep a close eye on what is happening on the Japanese market. We are also making a great effort to build up our own expertise through such things as the microelectronics program."

Thus American technology is indispensable for many Swedish companies and this increases Sweden's vulnerability as a nation. For a manufacturing company with subsidiaries in other countries, the sanctions can be a catastrophe. Carl-Johan Aberg said that the embargo is a direct result of a deteriorating situation between East and West. The embargo is in conflict with the spirit of free trade, but not with the letter.

No Influence

"The GATT statutes say that a country can restrict trade if it involves the country's security. It is not realistic to think that we can influence American security policy."

Almost 200 companies in Sweden currently depend on a so-called distribution license. But the number of firms requiring other types of licenses is many times greater.

On 23 April the distribution license regulations were tightened up. This means that a firm with this type of license must set up so-called control units. Responsibility for complying with the rules rests on people high up in the hierarchy of a company. The company must also obtain a list of

blacklisted people or companies. It will not be enough to say that one did not know that this customer or that was blacklisted. The company must also have a continuing program for internal audits.

Personnel training is also part of the program. Personnel must be regularly informed of new regulations that have gone into effect.

Inconvenience and Bureaucracy

Tell Hermansson, director and foreign head of the Stockholm Chamber of Commerce and one of Sweden's leading experts on export control said:

"One disadvantage with this system is that the American Department of Commerce has to handle an enormous amount of licenses. This leads to long waiting periods, inconvenience and bureaucracy.

"When trade is regulated there are always some companies that benefit from it and some that do not."

Tell Hermansson said that it is completely unacceptable to allow Sweden to become a transit nation for the smuggling of technology. It would also make international relations more difficult.

"If we do not follow the rules, we will be put in the same class as the Soviet Union," continued Tell Hermansson. "We cannot get along without this technology. One can say that this is a dependency that we cannot free ourselves from.

"But I think this policy has caused American companies to lose markets."

Discussion in the United States

There has been a sharp discussion of export control in the American Congress.

People in the private business sector view this as a hindrance, while many in Congress maintain that this is a way of preventing American technology from being used for military purposes.

Brooks Ohlson, the export control attache at the American Embassy in Stockholm, would not express an opinion as to whether export controls are good or bad:

"I am just here to make sure the rules are complied with. The politicians in Washington have to make those decisions," he said.

Problems for Companies

A necessary evil. That is the usual comment among Swedish businessmen with regard to the American export control regulations. No one likes them, but they must be followed to the letter.

It is quite obvious that the regulations are regarded as inconvenient. Tangible evidence of this was given recently at a big conference in Stockholm. Some 250 businessmen sat and listened attentively when representatives of the U.S. Department of Commerce went through the regulations and talked about which forms companies should use.

Thus there is a great deal of interest in learning the regulations. It is usually not enough for one person or several people in a firm to become familiar with the rules. Everyone involved in exporting must know what they are. Here are some selected comments from the conference:

Harald Hecht, ASEA Generation: "It has taken me 2 years to learn all the rules. But I am still not sure that I know all of them."

Michael Burgess, Business Flight, Copenhagen: "We sell airplanes. We have had tough export rules in Denmark for several years, so I do not consider them to be a problem."

A small businessman (anonymous): "We don't have the money to take care of the paperwork. I regard the regulations as difficult. I would rather not have anything to do with the United States."

Henrik Sorensson, ASEA Cable, Stockholm: "We just have to accept the regulations. The United States is the one to decide."

USSR Buys Automatic Production Lines

Stockholm NY TEKNIK in Swedish 24 Apr 86 p 3

[Article by Mikael Holmstrom: "Sweden Sells Technology to Soviet Union"]

[Text] Two big Swedish export deals were concluded during Ingvar Carlsson's trip to Moscow.

ESAB sold two automatic production lines for the manufacture of rear axle housings for trucks and Sandvik sold a saw-blade factory.

At the same time the Soviets expressed concern that the new Swedish export controls on high technology would create problems for Swedish-Soviet trade.

ESAB landed the biggest order and will make a delivery to the Gaz truck factory in Gorky. The order consists of two fully automatic production lines for rear axle housings and some other machine equipment.

These lines are the most automated in their field that ESAB supplies. The automation goes farther than it does with Volvo and Saab-Scania, for example.

After a worker welds together the plates that will be turned into a finished rear axle housing, everything is done automatically. The metal housing is butt-welded, machined, tempered, cleaned, leveled and pressure tested for leaks all completely automatically.

The two lines can produce 160 rear axle housings an hour. They will be mounted in trucks with a 4-5 ton load capacity. ESAB's order is worth 230 million kronor.

Saw Blades

The other big order went to Sandvik, which will deliver the interior of a factory for the production of bandsaw blades from two different kinds of steel.

This involves welding the back of the saw to a cutting edge made from a harder type of steel.

The order also includes technical expertise. Some of it involves steel production and some applies to the final treatment stage in the saw-blade factory.

Electronics

The finished blades will be used to cut metal pipes and rods.

Sandvik will receive 110 million kronor for its part of the order.

Thus the biggest export orders involve factories with a lot of electronic equipment for controlling processes. But ESAB and Sandvik do not feel that the embargo policies of various western countries against the Soviet Union will hamper business transactions.

They say that components have been chosen in such a way that exports can be made to the Soviet Union without running into licensing problems.

The new Swedish export control law for foreign civilian high technology, which takes effect on 1 June, was discussed several times at the political level.

Although the Soviet Embassy in Stockholm had previously asked several questions about export controls, the Swedes are now being asked more questions.

Russians Uneasy

Sweden has repeated the government's line that we refuse to be a transit land for technology smuggling and that Swedish technology is not subject to these controls.

The Soviets noted their displeasure with the western embargo policy. They also pointed out that Swedish products often contain foreign components--and are thus covered by the embargo policies of the United States and other western countries.

The many Soviet questions clearly indicate their concern that the tightened export controls will interfere with Swedish-Soviet trade.

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WEST EUROPE/TECHNOLOGY TRANSFER

BRIEFS

FINNISH VALMET IN EUREKA--(FNB)--Along with 18 other European electronics firms, the state-owned Valmet Corporation is participating in a development project called Eurobot. The project, which is part of the Eureka program, is concerned with process automation and is expected to take 6 years. Valmet reported on Thursday that the total cost will come to just over 100 million markkas. [Text] [Helsinki HUFVUDSTADSBLADET in Swedish 9 May 86 p 20] 11798

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EAST EUROPE/COMPUTERS

GDR DELTA COMPUTER NETWORK DESCRIBED

East BERLIN SPECTRUM in German No 2, 1986 pp 1 - 3

[Article by Prof Dr sc nat Hermann W. Meier, Institute for Information Science and Computer Technology (IIR)]

[Text] The IIR of the Academy and Dresden Technical University collaborated in developing the DELTA computer network. It has proven itself in productive use for five years, and during this time it was also expanded step-by-step. Computer centers in Berlin, Potsdam, Dresden, and Prague are currently linked to one another through the DELTA computer network. It has also found application in production. Thus, the VEB Mansfeld combine "Wilhelm Pieck" uses this concept. Furthermore, the DELTA system is integrated into a series of minicomputers from various enterprises which are distributed over the entire GDR. If research initially stood in the foreground, the DELTA computer network recently has also been increasingly effective in the economy. For example, it forms the communications basis for an EDP model "Overhead-Irrigation Consultation" of the Academy of Agricultural Sciences. More than 300 agricultural enterprises have received directives concerning the optimal artificial irrigation of their cultivated lands. It has thus become possible to operate 80 percent of all irrigation systems in our country according to scientifically based criteria.

At this time, the Institute for Information Science and Computer Technology is participating, in national cooperation, in the further development of computer-supported communication. We asked our author, one of the architects of the DELTA computer network, to give us an overview of trends in current computer communication.

The Path to Computer Linkage

Basing itself on progress in microelectronics, computer supported communication is developing into a high technology which occupies a key position in the intensification of economic information and communication processes. Every modern industrial state must master and deploy these new communication technologies to remain internationally competitive. As a consequence of the on-going integration of computer-, communication-, and office-technology, there is a major transformation of information and working processes, as well as of communications relations. With the development of local networks, of

public data networks, and of narrow-band service-integrated digital networks for the local and non-local area, the construction of a computer-based communications infrastructure is currently in progress. This serves as a basis for computer and communication services extending over the entire network. Long-term research is looking forward to digital broad-band communication networks, which are supposed to afford integrated data-, text-, video-, and voice-communication.

At the beginnings of computer technology, efforts were mainly directed towards constructing computer systems which could solve numerical tasks of large scope in a short time. This "processing of numerical data" also was the sole use function of the systems of that time. Already in the 60's, as memory technology progressed, a second use form of computers evolved, the "memory function". The availability of mass memories with high capacity and the working out of hierarchical memory systems permitted the construction of data bases and information systems with on-line memory capacities on the order of 10^{12} to 10^{13} bits. This advanced the classical computer to a "computer-information system". Both the rapid rise of processing power and the construction of data bases made it possible for a large computer system to be used only by many users who worked simultaneously with the computer. For this purpose, concepts were developed which made it possible to process several user programs at the same time on the basis of the available computer resources (multiprogramming), and to give several users simultaneous access to the computer directly from the workstation via local or remote terminals (multiple access and remote data transmission).

Starting from the concept of remote data transmission, the need developed to use not only the resources of a single computer but also the multiplicity of capacities of a large number of different computers in remote access. Consequently, during the 70's, remote data transmission was developed further in the direction towards computer-computer communication.

It thus became possible to couple a large number of locally situated or even remotely situated computers through communications channels of various speed to form one computer linkage in the form of a local or global computer network. For the user, such a network appears as a spatially distributed computer system with a large number of different resources. He can use these resources directly - analogous to the classical remote processing system.

With the manifold implementations of computer-computer communication, the "communication function" evovled as a third form of utilization. Conceived of originally only as a base for the interaction of individual computers, its purposeful further development led to the availability of qualitatively new, innovative telecommunication services. The distributed computer system became the "computer-information and communication system". For the user, it is of prime importance that this makes available both computer and communications technology on the basis of computer-supported work stations, on a broad scope directly at the work station.

A specific computer linkage is constructed and used according to a series of objectives which define both the user groups and the computer centers as computer network operators. The "resource and function linkage" makes available to the users a part or all of the software and hardware resources integrated in the system. For example, the user can utilize special processors or special software systems which are situated in other computer centers and which are serviced by special software collectives. Centralized EDP projects can be organized in a similar fashion, where the input and output of data may occur in decentralized fashion, i.e. distributed over the network, while the actual project processing occurs in centralized fashion on a selected processing computer.

Through the "data linkage", the authorized users obtain access to all data inventories stored in the computer network. This form of linkage is especially intended to make accessible data bases and information systems for a large group of users. Special capabilities result from the construction and operation of distributed data bases. In this way, partial data inventories can optimally be stored and serviced at selected points of the network. By taking into account the access frequencies and distributions, the partial data inventories can be adequately distributed over the network. Thus the required data transmission lines can be suitably minimized.

The "load and availability linkage" guarantees improved distribution of the job load among the processors integrated into the computer network. Load peaks can more easily be dealt with, the users obtain shorter processing times, and capacity reserves can be kept at a minimum. In case a computer has trouble through damage or maintenance, one can furthermore displace its job load to still operational system components.

The "communication linkage" is the basis for various forms of computer-supported person-person communication. This includes the possibility of interactive communication, where both partners work simultaneously at their terminals and memory-oriented communication services, where messages can be transmitted and received at different times.

The above-mentioned forms of linkage are used internationally in various ways in order to satisfy social and economic needs for a quick supply of specific information at the work station and for reliable forms of communication. This is done on the basis of both local and national or global networks. Increasingly, international computer-supported communication is also developing.

Examples of this are:

- The coupling of individual CAD/CAM workstations into integrated systems, and guaranteeing direct access to local or non-local data bases and information systems,
- the construction of integrated production/transport chains on the basis of telecommunication systems to increase the overall efficiency of production processes and to secure complex material flows over several process stages,

- the intensification of processes in plant production through computer-supported irrigation consultation of the agricultural enterprises,

- the rationalization and intensification of transportation processes in traffic,

- the intensification of research cooperation of collectives working at a distance from one another, especially also in the context of international collaboration,

- the furnishing of scientific and technical information by computer-supported access to national and international data bases,

- the automation of scientific experiments by using locally-coupled computers.

Communications Infrastructure

Despite many coordinated objectives, the computer network projects of the 70's were generally based on different and incompatible system solutions. Thus, it was not possible for one network to use the resources of another network. With high-grade data bases and with the development of innovative telecommunications services, users began to require supra-network access. The construction of gateway computers made it possible to overcome the incompatibilities existing between various computer networks, at least for a selected set of computer network services, and to establish couplings. Furthermore, international activities were initiated to standardize the communication tasks. As a result of these endeavors, there exists a "reference model for coupling open systems". A series of recommendations for standards has already been formulated for this model. This model is increasingly establishing itself as compared to special, manufacturer-specific network solutions. On the one hand, it makes available a means to compare the various network models; on the other hand, the problems of coupling the networks involving different system implementations can be considerably reduced in advance.

This reference model proved extremely important for recent international developments in the construction of a computer-supported communications infrastructure. Most of the computer networks of the 70's were constructed as private or area-specific networks. They worked predominantly with their own communications subsystems based on leased lines. Economic reasons, the pressure for automized deployment of national message transmission resources, progress in computer network technology, in combination with growing needs for data communication, led to a search for new solutions for message transmission. The communications subsystem was singled out from the "computer network system" and was developed as an independent, generally national, "data network". With the construction and operation of these computer-supported data networks, the communcation administrations worked out a new type of public networks to implement national data-, text-, and video communication. In analogy to the procedure with telephone networks, these data networks were coupled internationally and today make possible worldwide computer-supported communication. Here, the actual computer networks of the user areas, the user networks, use the particular public data network to couple their resources.

The scale of present data networks today includes several tens of thousands of user connections. For the beginning of the 90's, 150,000 to 200,000 connections are expected.

Starting from this development of non-local, computer-supported communication and the requirement for coupling the computer resources in the local area (within a building or a population area), the trend is currently forming towards integration of various specific communications structures.

In the local area, system solutions in the form of local networks are currently dominating. Their transmission rates lie between 100 kbit/s and several 10 Mbit/s. Data-, text-, and picture-communication predominate in the applications. As a supplement thereto, systems are being developed which are based on the digitalization of the transmission and relaying technology of current local telephone networks. They permit the construction of so-called "narrow-band service-integrated digital subscriber systems". These installations should have a capability for voice-, data-, text-, and picture-communication, based on a uniform digital network. Both network variants, the local network and the narrow-band, service-integrated digital subscriber station, form perspectively the technical communication basis for the local communications infrastructure.

Similar trends are appearing in the non-local area. On the one hand, the national data networks continue to be expanded. On the other hand, programs are running which aim towards the digitalization of the telephone long distance network and which are thus preparing, for the beginning of the 90's, the transition towards non-local, narrow-band, service-integrated digital networks. Furthermore, further actitivies (such as e.g. the programs RACE of the EG or EUREKA) are intended to create the scientific-technical precursors for integrated broad-band communication. In addition to narrow-band services, this will include moving picture communication.

For the next ten years, the non-local public digital data network and the public narrow-band, service-oriented network will form the basis of the non-local communications infrastructure. They will make possible numbers of subscribers such as are familiar with present telephone networks. Thus, a computer-supported work station can connect to local, national, and international communications.

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EAST EUROPE/COMPUTERS

AGFA HOPING FOR COM SALES IN HUNGARY

Budapest SZAMITASTECHNIKA in Hungarian No 3, Mar 86 pp 1, 3

[Article by Elek Nagy and Ivan Szabo: "The Agfa and Datorg Cooperation"]

[Text] The Austrian organization of the Agfa firm, in cooperation with the Datorg Foreign Trade Data Processing and Organization Company and the Agro-Industria Innovation Enterprise, held a very high quality computer and organization technology equipment exhibit at the Atrium Hyatt Hotel. Datorg has been working for several years with microfilm and, for example, is dealing with photography and transfer to microfilm of computer printouts in its own microfilm laboratory. The needs of domestic foreign trade organizations, the search for progress and tools for expansion and the increasingly refined services and advantages of a COM [computer output microfilm] system, the search by the foreign firm for markets, its desire to open toward Hungary and the other socialist countries, the flexible search for a profile and service policy of the 100 person Agro-Industria service operation and the coinciding of the interests of all the above resulted in the two day exhibit, and Dataorg agreeing with the Agfa firm to create a joint reference plant for one year. They hope to do multi-shift production in the plant for testing purposes and on the basis of the experiences they will decide on the final technical equipment for the plant and on its legal status. Datorg will receive the equipment for the experimental plant within the framework of a use loan contract. As a result of the cooperation of Datorg and Agro-Industria the program was well attended, primarily by the customers of the domestic organizations who will be potential users in the future.

About 50-60 large capacity COM systems are in operation in Austria; 34 of these were made by Agfa. They sold four systems in Czechoslovakia, using the SZM-4/20 system there as the computer technology background. At the exhibit they connected an Agfa 2300 COM printer--it can be used online and offline, has a speed of 120 microfilm sheets per hour (equal to a speed of about 24,000 fan paper sheets per hour), the capacity of one microfilm sheet is 200 fan paper sheets, corresponding to about 20 times the capacity of a 600 line per minute printer--with the 1140 system of the KFKI [Central Physics Research Institute]. The two systems are completely compatible and all one has to do to connect them is change the plugs for the test and display connection. It is still an open question how this system will work here in the future, with what computer. It is also an open question how it would be useful to install such

large capacity equipment. Certainly it would be worth studying the possibility of installing one large capacity system for each branch of industry, and work out the applications and methods of access to the system. We already have domestic experience (for example, at the SZUV [Computer Technology and Management Organization Enterprise]).

The Agfa firm exhibited much other reprographic and microfilm equipment in addition to the COM system. Noteworthy from the computer technology viewpoint was an intelligent graphics system connected to an IBM PC which can be used for text and figure editing. The S200 PC scanning unit digitizes an A/4 page in 3 seconds with a resolution of 4-16 million pixels (they deliver it in four different versions) and 64 shades of gray. The data transmission speed can be selected between 110 and 9,600 baud. The other element of the system is the P 400 electrophotographic illuminating diode printer with a capacity of 18 pages per minute. It contains five standard letter sets in 2 M bytes of EPROM storage but this can be expanded by another 48 letter types in cursive, bold or other special forms. One can also connect two floppy disk units or a 9.8 M byte Winchester store to it. This unit can be connected to a computer in the online mode with a serial, asynchronous, synchronous or parallel interface. The data transmission speed is 19,200 baud.

Traditional microfilm technology was represented by cameras, readers, developers and remagnifiers. The COPEX D 6000 16 mm camera is suitable for photographing the most varied originals, on films 0.06-0.13 mm thick, up to the A/3 size, with a speed of 50 meters per second. Illumination and focusing are automatic and one can make two copies of one original at the same time. For special applications areas it has automatic document cancelling and serial numbering built in. Reduction can be 1:24, 1:35, 1:40 or 1:50 by using different camera units.

The COPEX LD75D and the portable, briefcase size COPEX LF 203 represented the reader equipment. The two built-in lens systems make possible magnifications of 24, 36 and 48 or 42, 48 and 72 times on a screen 290 x 280 mm. The index cards facilitating search can be 1:42, 1:48 and 1:72.

The briefcase version weighs 6 kilograms and can be operated on a battery. Projection is on a 300 x 300 screen on the inside of the briefcase cover. The COPEX LK P reader-remagnifier can handle both microfilm sheet and roll film. It's screen size is 365 x 300 mm, copying speed for single copies is 10 seconds, or 10 copies per minute for multiple copies. It works on normal, A/4 paper.

The program was aided by a new partner record keeping system developed by Datorg for an IBM PC computer. It registered and evaluated those showing interest and the direction of their interest on the spot. The system already operates at about ten places at home and abroad.

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EAST EUROPE/COMPUTERS

HUNGARIAN COMPUTER SPECIALISTS IN IRAQ

Budapest SZAMITASTECHNIKA in Hungarian No 3, Mar 86 p 2

[Interview with Dr Peter Jacso, project leader, by E. N.: "Hungarian Computer Specialists in Iraq"]

[Text] The Library and Documentation Main Department of the SZAMALK [Computer Technology Applications Enterprise] completed a significant project in Iraq last year. In the period extending from January 1984 to June 1985 a team of six persons adapted a computerized library and bibliographic information system and put it into operation in Baghdad, bringing sales receipts of more than a quarter million dollars. We talked with Dr Peter Jacso, project leader and chief of the main department, about the circumstances of setting up the undertaking, the tasks and the results.

[Question] How did you succeed in getting such a commission? It is well known that the developed capitalist countries have much more experience and a much better hardware-software background for such a task.

[Answer] This is true in general, but in regard to the concrete task the Library and Documentation Main Department of the SZAMALK also has several years of experience, a very good expert staff and a suitable IBM hardware-software environment. We could show our Iraqi partners systems very similar to the applications to be developed, in our own library, and in the course of a preliminary discussion we solved a minor problem, one which had caused them a problem for a long time, in connection with use of an international online information service center. On the basis of the achievements and personal acquaintance with those cooperating they decided to entrust implementation of the task to us. I feel that they also looked favorably on our bid because we could offer a complex service, beginning with instruction, through a status survey, to putting it into operation and doing the initial operation jointly.

[Question] What are the SRC and SDC dealing with? Please introduce these institutions to our readers.

[Answer] The SRC (Scientific Research Council) was formed in 1963; it can be regarded as the most important scientific research institute complex of Iraq, dealing with basic and applied research in harmony with the developmental plans of the country. It is carrying out especially important activity in the

development of agriculture, irrigation, minerals prospecting, health affairs and industry. A number of research institutes are linked to the center in Baghdad. One of these is the SDC (Scientific Documentation Center) collecting and providing scientific-technical information. Since the SRC also carries out certain authoritative, coordinating tasks I might compare it to the OMFB [National Technical Development Committee] while comparing the SDC to the OMIKK [National Technical Information Center and Library]. The library of the SDC has about 10,000 volumes (the individual research institutes have separate libraries too); the center receives 3,000 journals, of which 2,500 are in the English language. Each year they prepare about 800 bibliographies (still by manual methods!). It is a noteworthy provision of the SRC that research cannot be initiated without a prior literature search, preparing a retrospective bibliography.

[Question] Were there language difficulties in carrying out the project?

[Answer] No. A large number of those working at the SDC graduated from English, American or French universities, so not only are they highly qualified but they also speak English outstandingly. There were always those who knew English well on the teams working with us. In any case, as I already indicated, the overwhelming part of the technical literature is in the English language so use of the English language is natural for those working in this institution.

[Question] What sort of computer technology resources could you rely on in solving the tasks?

[Answer] The institute is surprisingly well supplied with hardware. In our work we used a large configuration IBM 4341 system. We could get machine time at any time of the day. Sixteen terminals operated in a local mode and a Hewlett-Packard 2645 A intelligent terminal was available for searches from the Dialog databases.

[Question] Do they have printers for Arabic, can they process Arabic language bibliographic items in the computer center?

[Answer] No. But we did not need this either. The information service is built entirely on the English language professional literature. We did not even have to worry about transliteration, because during our stay in Iraq a new standard in connection with this was being developed, and other complications would have to be reckoned with. In any case, studying the English language professional literature represents no difficulty for the researchers belonging to the SRC. They publish a surprising amount in English in the international journals. We found as many articles from Iraqi authors in the BIOSIS database, on agricultural themes, as, for example, from Dutch authors.

[Question] What did you undertake to do, and how much of it did you succeed in doing?

[Answer] Naturally our status survey prepared in 1984 and our bid were broader than what the Iraqis finally asked us to do. I feel, however, that with our work thus far we have satisfied the most urgent needs and laid the foundations

for further development. Considering that agricultural research in the broader sense (animal husbandry, water management, use of solar energy) has very great significance in Iraq it seemed appropriate to take and make accessible online the magnetic tapes of the BIOSIS database, the richest on this subject, and of INSPEC, the most comprehensive in the area of technical sciences, for the purpose of retrospective information search and providing continuous information. Because of the limited capacity of the background stores they are keeping "only" the files for 2 years each on disk in the online mode. Obtaining data prior to 1984 can be done from the databases of Dialog. As an applications program package we installed the CDS ISIS, made available free of charge by UNESCO and already proven at the SZAMALK. In the course of creating the BIOSIS sample data base containing half a milion bibliographic items and the 10,000 item INSPEC sample data base we trained the programmers and organizers in system maintenance and development and trained the information specialists to use the databases and manage the information services. Parallel with the above work we also built an online journal catalog. Our method here--guided by factors of economy--was to import the catalog items on magnetic tape from the International Center of Periodical Publications, supplementing them with data from journals not figuring therein and with local data characterizing the eight member libraries participating in the system. The Hungarian National Periodical Database is also prepared using such imported items, and in case of need we obtained willing aid from the workers at the National Szechenyi Library who are participating in this work. We also prepared an online library catalog which contains data on about 30,000 books. For the time being this does not replace but rather supplements the card catalog, until it is completely loaded. The data carriers which can be read by machine are provided by the same firm which provides catalog cards for the books. These must be supplemented by local data. There is no such possibility for 10-12 percent of the new books; for these the records must be created locally in their entirety, in the same standard format. Both the journal catalog and the book catalog are outstanding tools for the fast, efficient retrieval of information from many points of view, and they are outstandingly suitable for preparation of printed central catalogs or abbreviated and/or sorted notes according to theme, location, document type, etc.

[Question] Were the customers satisfied with the solution of the tasks and the results achieved? Will there be a continuation to this job?

[Answer] All contracting partners tried to meet their committments to a maximal degree. Our work enjoyed absolute priority within the SDC; the Iraqis put their best workers at our disposal. We solved every task and we did the initial operation phase together. We had promising talks about putting another database into operation, about integrating the local research reports and dissertations into a system and even about creating a microcomputer library information system. All this proves that our undertaking was a success.

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COMPUTER SYSTEMS AT HUNGARIAN AIRLINES

Budapest SZAMITASTECHNIKA in Hungarian No 3, Mar 86 p 7

[Article by Mrs Tibor Petrasy: "Computer Systems Used at the MALEV"]

[Text] In the 1960's the large airlines of the world already recognized that passenger services, first of all, must be put on computer. Making use of their potential, at great cost and with a great expenditure of time (this can be measured in terms of hundreds of millions of dollars and in decades), they developed their own computer systems. The small and medium airlines--such as MALEV [Hungarian Air Transport Enterprise], for example--would not have been capable of developing computer systems on their own, but obviously there was need for a solution if they were to be relatively competitive with the large airlines. The SITA offered help in this when it recognized that in addition to providing a telecommunications network for exchange of information among the member airlines of an international organization there was also need for computer services facilitating the exchange of information. Three preconditions are needed if an airline is to make optimal use of computerized services, that is be able to communicate without human intervention:

--an international line network on which traffic sent by different computers can be handled uniformly (SITA),

--standardized message formats which can be processed by every computer without human intervention (IATA), and

--the computerized services themselves--hardware, software and peripherals (SITA).

The SITA--Societe Internationale du Telecommunications Aeronautiques--was formed in 1949 at the initiative of 11 airlines to create a common network satisfying their telecommunications needs. At present it has 273 members and the net which originally handled only telex traffic must handle traffic between computers and peripherals and between computers working with different protocols. This required high level technical development and the development of standardized message formats which was done by another international organ of air transport enterprises, the IATA--International Air Transport Association. The SITA always subordinates itself to the decisions of the IATA.

The SITA is not an association striving for profit. It is supported by the member airlines with advances and shares purchased in proportion to their traffic and via bank loans. Only the user airlines pay for the computerized services offered. The SITA repays to the users, in proportion to their contributions, any extra receipts following the closing of the subject year and the annual general assembly.

The telecommunications network of SITA extends to 161 countries and it maintains centers in 1,027 cities. The technical equipment of the individual centers depends on the quantity and quality of the traffic handled there. The 16 most trafficked centers have completely automated, duplicated or tripled equipment; data flow speed among them is 14,400 bits per second. Ninety percent of the several hundred regional centers attached to this part of the net are automated and only ten percent are manually operated.

The traditional telex traffic conducted on the SITA net is called B type traffic. The network enciphers and stores the messages and in case of need they can be retrieved or repeated. At present one can access the SITA network in the teletype mode from about 15,900 airline offices.

Traffic conducted between computers and their peripherals is called A type traffic. At present the network handles the traffic of 66 different computer systems and about 13,500 reservation terminals in 126 countries.

Passenger reservation was introduced in 1975 as the first and most important special computerized service and MALEV has been using it since then. This is the reservation system known as GABRIEL. The computer center is in Atlanta (Georgia, USA) and now works with a Univac 1100-83 computer which was put into operation in 1983 after the removal of the Univac 494 system. The latter could no longer satisfy the increased user demands either quantitatively or qualitatively. The personnel of the Atlanta center maintain a 24 hour service to prevent any disturbance to the hardware and software, to provide the aid or advice requested by users and to carry out the program modifications and further developments requested by the users.

At present 40 small and medium airlines use the service including, among the socialist airlines, MALEV, CSA, LOT and BALKAN. The air transport enterprises using the system communicate with the hardware via the SITA net with terminals located in their service offices. The response time for each query is 2-5 seconds.

The terminal equipment consists of a processor with storage, a screen display with keyboard and a printer. The operator first writes the query, data or transaction on his own screen and then, after checking the correctness of the text, sends it on to Atlanta. The response appears on the screen and if needed can be printed out.

Since the chief function of the system is passenger reservations the system maintains two databanks.

The common databank is available to all users and contains the user schedules and the schedules of every airline the storage of which has been requested by

some user, but independent of this one can get a seat on any flight in the world since the system passes on to the requested airline the reservation telex without any human intervention.

The system records the status of the flights entered and stored as follows:

A--available status, meaning that there are free seats of the desired class on the requested flight. In this case one is free to sell a maximum of nine seats on one's own flight, two for first class on an outside flight and four for another class. The system immediately informs the outside airline about the sale with an automatically generated teletype message, and the inventory databank for one's own flights is decreased by the appropriate number. The passenger can regard the reservation as fixed immediately. If more than the mentioned number of seats are needed the system automatically requests seats from the outside airline and takes cognizance of the response, arriving in the form of a teletype message, again without human intervention.

R--request status, meaning that there still are a limited number of seats in the desired class on the requested flight, but seats must be requested to avoid overbooking and the reservation can be regarded as final only after the response arrives. On one's own flights the number of seats which can be sold appears instead of the R status.

L--waitlist status, meaning that there are no free seats in the desired class on the requested flight, but the passenger can be put on the waiting list and in the event of a cancellation the system automatically reserves the freed seat for him.

C--closed status, meaning that the desired class on the flight is so full that it is not even worth putting the traveler on the waiting list.

The passenger data entered in the system ensure the reservation and satisfy various special on-board and ground questions.

The system prepares a so-called "PNR", passenger name record, on everyone traveling together in the same class. An individual reference number is given to every such record. Then these records can be retrieved and modified by both name and flight and reference number. The system automatically records in order what changes were made and who made them. This information can be read when retrieving the PNR. Each PNR has obligatory and conditional data or elements. The obligatory data are name, flight, address and information pertaining to the ticket. The conditional data can be the special airport or on-board requests of the passenger (for example, stretcher, special food, etc.), which the system takes care of requesting and confirming, and necessary information pertaining to the traveler (for example, speaks only Hungarian, has poor vision, etc.).

The above information also goes on the passenger list sent automatically to the destination station so that they can prepare the appropriate services.

Other conditional data are ground requests--hotel reservations, auto leasing, city tours, reservations for other ground transportation, air taxi, etc.

The system also makes possible retrieval of lists of the passengers on individual flights according to various factors (for example, passengers on waiting list, groups only, those with connections on the same day, those with special requests, etc.).

After a flight starts one must inform the system about the number of passengers actually taken on by class and section of route. The system uses these data for various statistical data collection purposes--for example, comparing the number of reservations with the number of actual passengers, combined load information for the previous day, system/agent activity, that is the number of activities performed by individual workers or offices the previous day.

The GABRIEL reservation system is only one of the SITA computerized systems used by MALEV. At present the SITA offers computerized services from two large centers. One is the Atlanta center from which one can make use of passenger centered services:

GABRIEL seat reservations,
GABRIEL hotel reservations,
credit card check,
search for lost baggage (BAGTRAC),
a databank storing travel information (TIMATIC),
a world-wide hotel reservation system (SAHARA),
an airfield passenger loading and flight start system (LOADSTAR).

SITA's other computer center can be found near London, from which they offer other services for airlines satisfying common needs. These include:

a system to automate cargo shipments (CARMEN),
a digital link between aircraft and the ground (AIRCOM),
flight planning, that is, optimal route selection on the basis of meteorological indications and aircraft parameters, calculating the necessary fuel needed (FLIGHT PLANNING).

In addition to all this the SITA does not exclude offering services satisfying individual needs of the several member airlines; it performs these tasks with locally installed minicomputers. With such an arrangement MALEV makes use of the following services:

a materials management and technical production control system;
an information system following flight changes at the two Budapest airfields;
the Hotel In-House system to keep records on and bill guests at the Atrium Hyatt hotel;
a data recording system facilitating receipts accounting functions.

The SITA is also planning to introduce new services such as automatic ticket issuing, a videotex service, passing on correspondence and other documents on the network and the CUTE service, that is, access to different types of computer systems from one terminal.

The long-range goal of MALEV is to process on a local minicomputer the data obtained from the various special purpose systems which needs further processing from the commercial point of view so that the enterprise leadership should have up-to-date information about market needs and use of flights, helping to make correct decisions in regard to medium and long-range developments.

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DATA ON LOCAL NETWORKS DEVELOPED IN HUNGARY

Budapest SZAMITASTECHNIKA in Hungarian No 3, Mar 86 pp 10-11

[Article by Attila Kovacs: "Chief Characteristics of Domestically Developed Local Networks"]

[Text] We have summarized in tabular form the fourteen local networks of ten domestic development institutes and/or fourteen trading firms. It can be seen from the data in the table that all local network systems have a baseband transmission mode and most have a bus topology. The maximal transmission speeds of the several systems vary between quite wide limits compared to one another, but 1 M bit per second can be regarded as characteristic. The transmission medium in most cases is a 75 ohm coaxial cable and in general LSI circuits are characteristic of the integration of the coupling unit. The internationally known net taken as a model is the Ethernet in most cases. About 40 percent of the networks shown did not pay attention to the international standard prescriptions. Only one of the types listed does not stipulate the type of computers supported. Among applications areas one can find measurement data collection and processing, office automation and computerized design and manufacture. At the time of preparing the status report six types, a total of 21 networks, were in regular operation. The vendors plan to put about 150-200 local networks into operation in 1986.

The total number of units for domestic institutions shown in the reference applications column does not necessarily coincide with the total number of operating networks taken into consideration by network types. In addition to the local network systems shown a few additional domestic developments are under way. Such, for example, is the network system being developed at the MIKI Measurement Technology Development Enterprise being created for industrial applications on an Ethernet base. We will return to these networks in later issues, giving their more important characteristics.

The data given in the table are of an informational character, taken from developers and manufacturers, and indicate the situation as of 1 January 1986 (or the ideas at that time).

(TABLE 1.)

	LANDEX	MMT-HNS (MMT NET & CABINET)	MC-NET	LOCHNESS	MULTINET/I
Developer	ATOMKI	Budapest Tech. U.	Controll Sm. Coop.	KFKI	Inst. Tech. Sm. Coop.
Vendor	ATOMKI	Medicor, Rolitron	Controll Sm. Coop., Gyor New Ear TSZ.	KFKI	Inst. Tech. Sm. Coop.
Trans. mode	Baseband	Baseband	Baseband	Baseband	Baseband
Topology	Bus	Bus	Bus	Bus	Bus
Trans. speed (M bit/s)	1.5	0.125	0.3	1.0	0.1 (tw pr) 1.0 (coax)
Distance (km)	1.2	0.5 (tw pr) 2.5 (coax)	1.0	1.0	1.0
No. Stations (max.)	255	128	254	32	128
Access mode	CSMA/CD	CSMA/CD (MMT NET), Central control signal (CABINET)	no data	CSMA/CD	CSMA/CD
Cable type	Coaxial 50 ohm	Twisted pair or coaxial	Coaxial	Coaxial	Twisted pair or coaxial
Coupling unit and IC	SSI,MSI,LSI Signetics 2652, RS 422	SSI,LSI Z80 SIO (MK 3884)	LSI Z80 SIO, DMA	LSI Signetics 2651-1	LSI Z80 family
Price of coupling unit (in 1,000 forints)	no data	10-100	36	500 (TPA) 350 (ICC)	about 50
Operating system, communications software	Compatible with DECNET	LLC, File Server, Filtra, VTP, Kermit	MC NET (compat. with CP/M 2.2)	Compatible with DECNET	CP/NET DR/NET, Msys,Minet MS-DOS
Price of com. software (in 1,000 forints)	no data	12-60	(Included in coup. u. price)	no data	about 100
Network taken as an example	Ethernet	Znet	Znet	--	--
Standards considered	--	IEEE 802.3	--	--	--
Computer types supported	Unibus, Qbus types	MOD-81, Rosy, Raab-84, MMT, IBM PC (plan)	MC-84, MC-86	TPA-11 family, ICC	Multi Center, Multi Center Turbo, MXT, MAT

(continue TABLE 1.)	LANDEX	MMT-HNS (MMT NET & CABINET)	MC-NET	LOCHNESS	MULTINET/I
Applications	Measurement data collection & processing	General (MMT NET) Control technology (CABINET)	Office automation Management organization	Measurement data collection & processing	Office automat., Management org., Software dev.
Operating in 1986/number to be sold	Being introduced	1/11-13	4/about 150	1/no data	Market intro./ no data
Reference application	ATOMKI	Szekszard County Hospital, Ajka Aluminum	Skala Coop, SZAMALK, MUSZI	KFKI	Instrument Technology Small Cooperative

(Left Half [LH] of TABLE 2.)	MULTINET/II	QSNET	PROPNET	PRONET	COBUS
Developer	Inst. Tech. Sm. Coop.	Qualisoft	SZKI	SZKI	MTA SZTAKI
Vendor	Inst. Tech. Sm. Coop.	Qualisoft	SZKI	SCI-L	Elektro-modul
Trans. mode	Baseband	Baseband	Baseband	Baseband	Baseband
Topology	Bus	Bus	Ring	Bus	Bus
Trans. speed (M bit/s)	10.0	0.04	0.5	1.0	1.0
Distance (km)	0.5	1.0	1.0	0.4-0.6 (1,2)	1.0
No. Stations (max.)	256	10	64	255	255
Access mode	CSMA/CD	Cyclic polling	Control signal	CSMA/CD	Adaptive CSMA/CD
Cable type	Coaxial	Four wire shielded, 300 ohm	Coaxial, 75 ohm	Twisted pair	Coaxial, 75 ohm
Coupling unit & IC	VLSI Intel spec. IC's	MSI 6526 (in a C-64)	LSI (micro processor)	LSI (micro processor) Z80 SIO	LSI (micro processor) Z80
Price of coupling unit (in 1,000 forints)	100-150	14	85	65	300
Operating system, communications software	MS-DOS, Unix compatible; Ethershare, Etherprint,	WOS QSNET	Promt, Komir, Workstation	Propos 3.0 Pronet	1-4 layer software & file manager

(continue LH of TABLE 2.)	MULTINET/II	QSNET	PROPNET	PRONET	COBUS
	Ethermail				
Price of com. software (in 1,000 forints)	100-200	14-18 per station	20	30	no data
Network taken as an example	Ethernet	--	--	--	Ethernet
Standards considered	IEEE 802.3	--	IEEE 802.4	--	IEEE 802.3
Computer types supported	MXT,MAT, TM-16	C-64,C-610 C-720	Proper-16 family	Proper-16 family	Personal computers in general
Applications	Office automation, Management organiz., Software develop., CAD/CAM	Multiple work stat. record keeping system	Resource service, CAD, Electronic mail	Resource distribution	R & D, CAD/CAM
Operating in 1986/number to be sold	Testing/ market introduc.	5/14	1/min 2	1/10-30	6/20-40
Reference application	Instrument Technology Small Coop.	Kner Press, Tigaz, Tatabanya Hospital	SZKI	Oil Plan	MTA SZTAKI

(Right Half [RH] of TABLE 2.)	FILH	PROBEWAY*	TECHNOCOMP	EXLOC 2.1
Developer	MTA SZTAKI	MTA SZTAKI	Technocomp small coop.	Videoton
Vendor	Vilati	Vilati	Technocomp	Videoton
Trans. mode	Baseband	Baseband	Baseband	Baseband
Topology	Bus	Bus	Optional	Bus
Trans. speed (M bit/s)	0.062	0.25	0.12	10.0
Distance (km)	2.5	0.6	2.0	2.5
No. Stations (max.)	17	17	256	256
Access mode	Cyclic polling	Cyclic polling	no data	CSMA/CD
Cable type	Twisted pair	Twisted pair	Coaxial or twisted pair or connected telephone	Coaxial, 50 ohm

(continue RH of TABLE 2.)

	FIIH	PROBEWAY*	TECHNOCOMP	EXLOC 2.1
Coupling unit & IC	LSI (micro-processor)	LSI (micro-processor)	no data	no data
Price of coupling unit (in 1,000 forints)	no data	no data	no data	no data
Operating system communications software	CP/M MFB	no data	CP/M Mireal Minet	USOS Exloc
Price of com. software (in 1,000 forints)	no data	no data	no data	no data
Network taken as an example	Proway	Proway	--	Ethnernet; XNS
Standards considered	HDLC	HDLC	--	IEEE 802.3, XNS
Computer types supported	Intellicon, MFB	Probeway central computer 789 (WME bus)	TAP-34	VT-32, SZM-52, ESZ 1011 (plan)
Applications	Process control	Software development	General	Office automation; CAD/CAM; distrib. proc.
Operating in 1986/number to be sold	Developmental model	2/no data	Testing/ introduction	1/no data
Reference application	--	MTA SZTAKI Vilati	no data	VIFI

*PROBEWAY developmental network, on which FIIH can be emulated.

"Qualisoft" refers to the Qualisoft Computer Technology Developmental Small Cooperative.

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RESEARCH DATABASE GOAL OF HUNGARIAN POSTAL TESTING INSTITUTE

Budapest SZAMITASTECHNIKA in Hungarian No 4, Apr 86 p 1

[Article by A. K.: "Developmental Base for the Year 2000"]

[Text] They will soon put a TPA-11/440 high performance minicomputer into operation at the Postal Experimental Institute (PKI). With this system, equipped with 2 M bytes central storage, 80 M bytes exchangeable and 160 M bytes fixed disk CDC type disk drive units, a DOS-RV Plus operating system and extensive remote processing possibilities, the institute will be getting a computer technology developmental base offering complex, integrated services with which it can perform its chief activities in accordance with the level and requirements of the present age.

The basic tasks of the Computer Center of the PKI are creating efficient research databases and providing database service. During the Seventh 5-Year Plan the PKI intends to deal to an increasing degree with telematics and ISO-OSI based applications research, with applications connected with measurement control, measurement data processing and automatic remote supervision systems and with other technological applications, with automatic engineering designing systems and with the development of various postal services (route optimization, a branch directing and processing system, delivery control, automation of processing, a system to optimize newspaper distribution, optical certificate reading, etc.). Use will be made of the high operating speed of the TPA-11/440 in data processing and measurement control work, of its conversational mode operation in planning, of its multi-user character in serving all research institute tasks and of its realtime operation mode in measurement control and in development of background software for stored program controlled telephone exchanges.

The Network Concept

It is the aspiration of the PKI to exploit the network possibilities to a maximum degree, in addition to data processing, and also to make use of the new system for advanced graphics applications. Creating the background databases needed for effective research is one of their important tasks. With the aid of the TPA-11/440 it will be possible to develop high performance, capable conversational designing systems. With the network applications to be built up they will be able to increase postal cooperation projects by an order

of magnitude, they can link directly to various postal organs and thus, for example, develop applications systems jointly. They also expect from the graphics possibilities that new methods (light pen designing, etc.) will develop for the various planning systems, thus improving the efficiency of planning by an order of magnitude. Their plans include transferring the so-called national digital space model (DTM) from the ES 1030 computer to the TPA-11/440. They expect that they will thus get map sketches more quickly which are more precise than before, and more users will have access to the DTM also.

Goals For Near Future

The various network coupling units which belong to the TPA-11/440 are the following:

--two 16 channel asynchronous multiplexers with the aid of which, in the form of a terminal network, the already existing personal computers of the institute can be linked to the system, with the aid of VT-52 emulation;

--a 16 channel synchronous multiplexer to establish an X.21-X.25 (ISO-OSI) open data network link to support telematic data communications research and development;

--a LAN coupler for large computer support for local computer network (LAN) experiments and for developing links with local networks;

--the connection to the TPA level of the multi-level postal network takes place with a so-called DOSnet coupler with the aid of which one can have online cooperation with the computers of middle level postal organs and joint use of professional databases created at various sites, making possible the fast and efficient transfer of research results; and

--with the aid of IBM 3275 terminal emulation a direct online link can be built up with the large computer which will exist in the postal network.

Operational use of the TPA-11/440 computer is expected to begin in the fall. They plan a link with the TPA-1148 of the Newspaper and Parcel Post Directorate in 1986 and realization of the link to the computer of the Postal Radio and Television Technical Directorate, to be put into operation in the fall, will begin this year. In 1987 they expect to link the new computer of the PKI with the large computer which will be part of the Postal computer network, with the TPA-1148 of the Long Distance Telephone Directorate and with the TPA system of the Postal Investment and Planning Institute. The longer range goal of the institute is to develop a computer network link with the postal directorates in Szeged, Pecs and Sopron, with professional research institutes and with institutions of higher learning.

By putting the new computer into operation and with the developments of the near and more distant future it is expected that with the introduction of the planned new services the research-development-organizational activity taking place in the PKI will rise to a higher level compared to what it has been up to now.

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HUNGARIAN COMPUTER CENTER INSTALLS ES 1045

Budapest SZAMITASTECHNIKA in Hungarian No 4, Apr 86 p 1

[Article by Attila Kovacs: "An ES 1045 at the Gyor SZUV; A Rational Step to Solve a Dilemma"]

[Text] A new ES 1045 large computer system was recently put into operation in our country, this time at the Gyor Computer Center of the SZUV [Computer Technology and Management Organization Enterprise]. And not under just any circumstances--the investment worth about 100 million forints was realized in barely 3 months. It is well known that Gyor-Sopron County is among the most industrially developed counties of our country. In accordance with this the industrial culture made the enterprises and institutions here receptive to more modern solutions relatively more quickly.

The Gyor Computer Center of the SZUV performs large computer jobwork in the area of the county under above average market conditions. Recently they were faced by the dilemma that either they renovated the computer center or they would not be able to satisfy the demands which exceeded their capacity--and presumed a more modern technology. It appears that they recognized in time in Gyor that it would be possible to satisfy the needs of clients ogling cheaper solutions and the applications possibilities of place of work microcomputers only with a large system offering distributed processing.

The present investment, realized primarily at local initiative, will provide a "production tool" for at least 10 years. At the same time the ES 1045 means a performance increase of about 5-6 times compared to the ES 1022, which will continue to operate in the computer center, and significant new markets can be created in the northwestern part of Transdanubia with the new system which has the possibility of modern data transmission. It will be possible to use the microcomputers, placed out in the enterprises and linked with the large computer, not only for after-the-fact evaluation of economic and technological processes and to produce basic planning data, but also they will be immediate decision preparation and control tools for daily leadership and guidance.

A Novel Configuration

The system, which has 4 M bytes of central storage and two byte-multiplex and four block-multiplex channels, has been supplemented--for the first time in

the country--by the magnetic disk subsystem of the SZAMALK [Computer Technology Applications Enterprise] (one 556M control and four 506M twin drive units for a total of 800 M bytes). Thus the total magnetic disk capacity is 1,600 M bytes. It is possible to write on the ES 5612 magnetic tape units with a density of 800/1600 bpi. The TELE-JS system has an ES 7904 local control unit, eight ES 7917 display terminals and an ES 8371.01 remote processing processor to which 23 terminals can be connected.

Expected Advantages

At present the computer center has about 80 clients who have processing done on about 140 themes. The great majority of the users are industrial and commercial enterprises, but one can also find among them a state farm and most recently a local state administrative organ. The Gyor Computer Center was the first in the provincial SZUV network which exceeded receipts of 100 million forints, in 1985. Their plan for this year is about 110 million forints. They have obtained significant extra capacity by putting the ES 1045 into operation; they will not be able to exploit this with traditional services among the existing clients. Among the new possibilities one might mention their contact with the Gyor City Council on the basis of which they hope to take care of data storage needs of the city and restricted environs of Gyor in regard to public works. The record keeping based on the Geokod requires the storage of about 1 G bytes of background information of which, according to estimates, 100 M bytes must be accessible online.

Another prospective application is connected with the city TV network. In the event of realization of the plans to extend data transmission possibilities the computer center could relatively easily solve remote processing for its clients within the city through cable TV.

Their plans include realizing between the TPA and the new ES 1045 the data transmission line connection existing between the TPA-1148 of the Sopron Computer Center and the ES 1022 in Gyor.

According to Dr Arpad Monoki, directer of the Computer Center, they want to call the attention of old and new clients primarily to the development, advantages and possibilities of distributed processing systems as the new system is put into operation. By using the ES 1045 they will shorten the through-put times in many cases, times which were critical or which could not be undertaken due to the capabilities of the earlier machines. They are recommending that users acquire an IBM PC or a personal computer completely compatible with it as the place of work computer for distributed processing.

The experiences with the first month of operation are extraordinarily reassuring from the viewpoint of reliability. Only the capacity of the printers reduces somewhat the performance of the whole system. As of the first of February, in the area of jobwork processing, various systems of about 15 enterprises (including seven with daily throughput times!) had been run on the ES 1045 large computer.

So a rational step has been taken. The Gyor Computer Center of the SZUV is offering public bodies qualitatively new services in an expanded form and one can also find in the modern distributed processing system public works service possibilities affecting the populace directly.

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SOCIALIST COUNTRIES ONLY MARKET FOR HUNGARIAN COMPUTER INDUSTRY

Budapest SZAMITASTECHNIKA in Hungarian No 4, Apr 86 p 2

[Article by Vilmos Harsanyi: "Afterthoughts"]

[Text] It is not absolutely necessary that what one sees at an exhibit should give birth to thoughts ripe for immediate implementation. It can also be an achievement if what one sees prompts one to think. And perhaps it should not be underrated if what one sees expands one's professional knowledge and horizons and strengthens his faith in the future of the profession, amidst more difficult economic conditions and at a time of narrower developmental possibilities. I would like to link these thoughts to the SICOB '85 article which appeared in the December 1985 issue of SZAMITASTECHNIKA, under the title "Toward the Giga's", supplementing it with a few timely thoughts pertaining to our country--desiring the greater cooperation of domestic manufacturers.

On the occasion of the SICOB there appeared--together with an extraordinarily large number of other publications, scientific works, textbooks and journals--a work bearing the following title: "La France dans la bataille des technologies de l'intelligence" (Jean-Paul Baquiast et Roger Ganne, La Documentation Francaise, Paris, 220 pp, 15 FF).

The work proposes a concrete project for the creation of a joint undertaking by European administrations, industry and research to finance investments, which is indispensable to create competitiveness.

Like the earlier Nora report, a detailed domestic analysis of the theme is made timely by the fact that the following were recently adopted:

a complex program for the scientific-technical progress of the CEMA countries up to the year 2000, and

the Central Economic Development and Organization Program for the Spread of Social-Economic Use of Electronics (EGP) as part of the Seventh 5-Year Plan of the people's economy, a program which must be realized on the basis of a broader international division of labor.

A good example of the integration of computer technology and telecommunications can be seen at the Swedish Ericsson firm, one of the large exhibitors at the SICOB and a representative of the characteristic technological trends of the world. Formerly Ericsson was known as a

manufacturer of professional communications engineering equipment. A characteristic station in the several decades of contact between Hungarian enterprises and the Swedish firm was the purchase of the license for the crossbar telephone exhange on behalf of the BHG [Beloiannisz Telecommunications Factory]. Recently Hungarian experts have worked for Ericsson, primarily in software development. Thus far because of the well known embargo--and despite multiple Hungarian initiatives--it has not been possible to buy from them a license for the new digital, stored program controlled electronic telephone exchange. In recent years the Swedish enterprise--modernizing its technology and its products and concentrating its capital and production--has appeared as a significant computer technology supplier in addition to its basic profile.

The path taken by Ericsson--not at all uniquely--is very worthy of note from the viewpoint of the development of the domestic electronics industry. The Hungarian professional communications engineering enterprises--although among the more developed in the socialist relationship, having traditions and a significant and economical net exporter position--are really far from being competitive on the convertible accounting markets. One reason for this is the partly technological and partly organizational separation of them (for example, one deals with switching technology while another deals with transmission technology while yet another deals with computer technology), but their technological generation backwardness and capital poverty are also reasons.

The negative effect of all three factors could be reduced by bringing their mutually supplementing technologies closer together on the basis of mutual interest, by possible organizational changes and by changing the basic activity of an enterprise--in addition to other measures. This could be aided by bringing in foreign working capital, competing for World Bank credit and by state support with preferences, credit, fund awards, etc. due to its role and high priority in the spread of electronics.

In the course of a possible further development of the EGP--which is not a complex program but rather primarily an applications oriented one--special attention should be given to the integrated development of professional communications engineering, computer technology and telecommunications and to influencing the cooperative behavior of industry and applications.

One can observe the integration of data processing, office organization and office automation and the increasing substantive kinship or identity of places of work, tools and methods of work. A good example of this is the mechanization of writing, then its automation and then the development of text editing.

The intelligent typewriter of today consists of three main parts--the intelligent display, the keyboard and the printer. Such, for example, was the WANG 1107 Assistant exhibited at the SICOB. Integrating the applied solutions and novelties of computer technology (such as displays, daisy wheels, semiconductor stores which can be built in and microprocessors by means of which one can achieve text handling, archiving, editing and reproduction in photo quality) offers great prospects and markets. Since not only the quality

of work (an unlimited number of "first copies") but also speed and performance are increasing significantly, office applications are profitable even at today's prices. One can count on the development of technology, a great increase in the volumes to be processed and on a significant decrease in prices. According to the indications the spread of such typewriters within 15 years will be similar to that of calculators today and by 1990 could already constitute a significant part of the typewriters in Europe, which can be put at about 3.5 million.

These are achievements and indications worthy of consideration by the Hungarian electronics industry as well. We produce similar devices and technologies or use them in the manufacture of personal and small computers.

Innumerable types of printers are produced at Videoton, in the Telephone Factory, at the SZKI [Computer Technology Coordination Institute] and in a few cooperatives. Several types of keyboards are already produced in Hungary (at the TKI [Telecommunications Research Institute] on the basis of a license and elsewhere by virtue of their own developments). Domestic enterprises also produce several versions of displays on the basis of a decade of experience (basically using parts coming from socialist import). As is well known the MOM [Hungarian Optical Works] manufactures background stores. The matured fixed head products are being followed by floppy disk units--even in a small size version--and will be followed by Winchester disks in the near future.

At the initiative of the Soviet Union and within the framework of the Computer Technology Intergovernment Committee they have now proposed the specialized organization of the manufacture of personal computers (PC's) by the socialist countries. According to what has been outlined there may be large series manufacture--compared to what we have been accustomed to thus far.

A fast, technically and economically well founded decision by industry is needed regarding participation, regarding what they will produce, when, in what quantity, etc. But economic guidance is faced with a choice at least as serious: How and to what extent can the export of PC's and peripherals count on the 1986-1990 plan coordination?

The mass spread of PC's fundamentally needed for the domestic spread of electronics can come only gradually, at a faster pace toward the end of the plan period but largely in the period after 1990. And this means that the net exporter position of Hungary in computer technology should increase--primarily in the interest of economical manufacture.

On the basis of what I saw I feel that there is no real breakthrough possibility for the Hungarian computer technology industry outside of the socialist market. At most there may be a chance on the non-ruble accounting market for software manufacture developing in the wake of a dynamically developing Hungarian software export and for the sale of custom systems which might be based on this.

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HUNGARIAN POSTAL SERVICE TESTS TELEDUPLICATING SYSTEM

Budapest SZAMITASTECHNIKA in Hungarian No 4, Apr 86 p 2

[Article by Gyorgy Bajnoczi: "New Service at Hungarian Post Office"]

[Text] The Hungarian Post Office introduced a new service on an experimental basis on 1 August 1985. They put teleduplicating devices--so-called facsimile equipment--into operation in five large provincial cities (Gyor, Miskolc, Debrecen, Szeged and Pecs) and in two post offices in Budapest (Budapest 114 and the TTNH), to test the possibilities of teleduplication. Anyone can make use of the services offered by the equipment and send a telecopy to the cities mentioned or to the designated districts in Budapest.

With the aid of the equipment the post office forwards the documents to the destination station and delivers them to the addressee, as they would a telegram, or, at the request of the sender, handles them as general delivery and informs the addressee of their arrival.

The basic size of the document which can be sent is the A/4 format (210 x 297 mm); they will also accept the A/3 size but because of the technical properties of the facsimile equipment in the office making the delivery it will appear in the A/4 format (if this is acceptable to the sender). (If the sender insists on preserving the size then the post office will send the document in several A/4 size pieces.) These documents can be written by hand or by machine, material produced by printing technology, drawings (line drawings) or caricatures, tables or official documents. Any of these can be reproduced on the facsimile equipment of the receiving office, if the documents are not colored or if they contain only a few colors. In any case the reproduction is in black and white. The equipment spares the original document, which proceeds unhurt through the equipment during transmission.

The basis for this service is the Bureaufax service already introduced in Western European countries. The Hungarian Post Office is using the system now operating, which is an experimental system, primarily to get experience and develop the optimal operational and management procedures. Depending on demand this service could be expanded in additional cities and counties of the country. But for this also they will have to use the experience acquired.

In accordance with the development of the profession the organization, goals and tools of the NJSZT have been handled freely, giving free reign to spontaneous initiatives and trying to make maximal use of individual ambitions and energies. Because of its situation it has been able to react adaptively, with initiative and ready for cooperation to social and economic events. In the 15 years of the history of the NJSZT which have elapsed the original six special departments (primarily of a scientific character) have grown to 14 (embracing various applications as well). It has built up provincial organizations in every county and expanded its operational area to support of amateur movements (HCC, microclubs). The swift growth of the area cultivated and of the organization naturally also brought dysfunctional disturbances, but the magnitude of these did not influence the positive reputation which the organization won with its growth dynamic and social contacts. Now, as we seek the tasks of the period ahead, we can establish that the mission of the Society and its fundamentally open atmosphere, ready for development and ferment, are lasting and require no correction. It is natural, however, that the professional, economic, social and organizational conditions of today bring up new emphases.

In my opinion the most important findings today are the following:

1. The fundamental factor determining the domestic future, strength and level of computer technology is to be sought now in changing the receptiveness of the Hungarian economy. In accordance with this the primary key to representing the inherent interests of our profession itself is to develop applications which bring economic and social results, improving the conditions which determine the applications.

It follows from this that the Society

--must participate more determinedly than heretofore in developing consumption habits and conditions for computer technology (informatics) products;

--must contribute more effectively than heretofore to discovering or getting to know applications which solve real problems, successfully resolve environmental constraints and are accompanied by the production of value. In this connection it must encourage more vigorously the linking of computer technology into technical, planning, production and marketing processes;

--must participate more purposefully than heretofore in formulating and realizing the goals of the central economic development and organization program for the spread of the social-economic applications of electronics (the EGP);

--must continue to draw into its zone of attraction the youth who are determining from the viewpoint of the future, and interested lay people, but the emphasis should be put on "teaching" and popularizing successful applications instead of just general propagation of knowledge.

2. The present economic situation and the coming to the fore of small undertakings encourages a developmental policy oriented toward short-term results and is accompanied by reduced social activity. In this period and

under these conditions and because of the longer range interests of the profession, the Society must preserve an openness toward professional values, must transmit the achievements of computer technology which are of lasting value and must raise the quality level of its own movements.

In the light of the foregoing findings the next tasks involve building up the organization.

Organization Building

The organization of the Society has filled out. One can expect an increase in the number of special departments bringing together people with similar interests as the number of applications areas increases. At the same time, with a restructuring of the interest areas of those working in the profession and with the internal development of the profession, some special departments and special groups will lose their timeliness and attraction. An increasing number of special departments becomes impossible to guide. One might recommend the development of a structure in which the basic organizational units are smaller than the present special departments, less permanent in accordance with changes in professional interests, but bring together people more closely involved in a theme ("special interest groups" in English). These units might be combined into organizations according to the disposition of their members which might develop according to the following areas of interest:

--those with scientific interests (those in research and development),
--those with manufacturing, production interests,
--those with applications interests,
--those interested at the hobby level (amateur level), and
--those interested in the social and economic consequences of computer technology.

In the provincial organization one can expect a build-up of the city organizations. The organizational and economic relationship of the county and city organizations has to be determined here. The development of a Pest County organization is a task before us, and we might consider the question of setting up a Budapest organization. The relationship of the amateur movement and the NJSZT should be resolved in a reassuring manner. The basic questions requiring clarification are: membership, economic independence or complete economic dependence, self-sustaining or joint work to a certain extent, legal and economic questions of software exchange and hardware sales, problems with premises, etc. A new task is the relationship of organizations for members of Hungarian citizenship working outside the borders of the country to the fraternal organizations of other countries and how to maintain contact with our members who are foreign citizens.

The number of organized members (enterprises as legal members) has not increased adequately as the organization of the Society grew. In the period ahead there must be a clearer definition of the advantages going with membership (for example, getting the membership journal, price concessions, the legal consulting service, entrepreneurial possibilities, special consulting, interest articulation, foreign exchanges of experience, etc.). Together with these questions we might discuss a change in membership dues.

The legal member enterprises should be brought into the life of the Society to a greater degree. The volume of services representing value to them must be enriched significantly. It would be useful to extend legal membership to the small undertakings as well, turning special attention to the unique professional and financial conditions of this group. There should be effective agitation to recruit members. There is especially much to do regarding the organization of the youth members for whom the positive professional experiences and the link to the Society represent a productive soil for openness toward the use of computer technology. In the event of a larger number of members and a stronger economic position our weight should increase in the MTESZ [Federation of Technical and Scientific Associations], that is there should be an increase in the number, strength and possibilities of our apparatus.

With the growth of the organization, and hopefully a significant number of new members will appear (with new areas of interest), we must review our operational mechanisms, must increase the mobility chances of individual members, must clearly formulate the expectations (rights and responsibilities) of new members, must increase the democratism of the organization and make the elections system simpler and clearer.

Professional Work

The Society does not do independent research and development work in computer technology.

But it can contribute effectively to the exchange of information among R&D sites working dispersed from one another but building on the R&D achievements of one another, in building up contact among them, and in developing a common professional value judgment which breaks through the frameworks of our institutional system which inclines toward provinciality and represents the interests of small groups in assigning tasks and evaluating results.

For this purpose:

--the research and teaching manpower of the universities must be brought into the Society's work better than heretofore, bringing in the student and creative youth at the same time and providing them a forum in connection with both reseaarch and teaching work (for example, debating study plans and study materials);

--there must be a striving for seminars and programs fewer in number than at present but deeper in regard to professional content, offering more basic information or status overviews, making use of modern instructional tools and methods (TV, radio, books, free universities, video films, etc.), contributing to information about and adoption of modern foreign (and domestic) achievements;

--there must be a striving for coordination of the larger programs (conferences, exhibits, other large programs), making their professional content deeper, and for a more precise distinction of the professional profiles of the several programs;

--there must be an attempt to increase the international exchanges of experiences, inviting scientists and researchers, holding conferences with international participation or aiding organized participation in such conferences and supporting the presentation of papers, developing further the exchange contacts with foreign associate societies which do not involve foreign exchange, aiding the possibilities of members for foreign exchanges of professional experience, expanding active contacts with foreign computer science societies and studying the possibility of building on closer contacts with the associate societies of socialist countries to produce suitable frameworks for joint action within the IFIP;

--domestic standardization activity must be aided by constantly watching the de facto standards, developing them and handing them on to the profession, supporting Hungarian participation in the International Standards Organization (ISO) and aiding through the PTB [Publications and Terminology Committee of the NJSZT] the work of the MSZH [Hungarian Bureau of Standards] connected with development of Hungarian terminology.

Applications and the Spread of Electronics

The Society, as an organization free of partial enterprise interests and capable of synthesizing professional information, must support as a chief task and by social means the realization of the program to spread electronics, creating a user culture and receptivity.

In the interest of this, with a suitable division of labor with the other scientific associations affected by the EGP (for example, the HTE [Scientific Association for Communications Engineering] and the MATE [Scientific Association for Measurement and Automation]), it must play the role of (associate) coordinator of the program from the social side.

In this capacity it must play the role of social counterpoint in the course of the development, supervision and guidance of the program; by summing up social experiences it must see to it that the program provides fuller support for users (development concessions, import supports, etc.); it must contribute to seeing that the goals and tasks of the program become known and are harmonized within the various strata of society (among manufacturers, developers, providers and users, among developers themselves, among users in the same branch, etc.). In addition,

--on the one hand it must urge use of standard solutions in manufacture, development and use and it must make people aware of and urge the spread of the best procedures and tools;

--it must aid the strengthening of market motifs with the aid of suitable informational materials (for example, a catalog of providers, a catalog of products, etc.) and by forming the social value judgment (for example, by organizing the functional and computer technology testing of professional microcomputer programs and providing testimonials, advertising notes or prizes for the "good" programs);

--it must cooperate ever more effectively in raising the receiving culture by providing suitable experience, with instruction (collections of case studies, examples of the economic efficiency of computer technology, permanent applications exhibits and professional consulting), by creating contacts among the associate institutions within the MTESZ with the aid of which one can bring to the surface possibilities for efficient computer technology applications (for example, joint seminars, joint conferences held for this purpose, developing "club life" among those working in various theme areas, which would make possible a productive interdisciplinary link for innovative work struggling with difficulties) and, striving for complexity, we must develop close cooperation with the appropriate associations involved with organization, leadership and the use of computer technology without emphasizing the primacy of them; and

--it must participate more actively than at present, preserving more moderation, in professional support for the computer technology work of the several authorities and ministries (standards, legal defense, legislation, changing product and technological structure, education, study plans, study materials, school computerization, etc.).

Socialization

It must play a leading role in the process of passing on information and forming views which is bringing basic information about and an interest in computer technology to the broadest strata of the nation via schools, popular culture and the mass media, taking care that the Society not be one among the competing economic organizations but rather, remaining outside this sphere, can remain a carrier and transmitter of social justice.

Another possibility in this area is offered by building up further the computer technology services of centers for free time, making use of various forms of providing information or propagating knowledge (radio, television, newspapers, the TIT [Society for the Propagation of Scientific Knowledge], etc.), primarily by methodical training of "users" (for example the series titled "Making Friends With Information"), a further development of the amateur movement, strengthening the informatics training and educational work of the armed services which provide possibilities for more training and further training among youth working in the units or among those awaiting retraining, organizing competitions, etc., organizing national and (eventually) international secondary school computer technology competitions and summer camps, supporting the university TDK [student club] competitions and organizing national secondary school computer technology competitions or TDK competitions, helping to judge them and supporting publication of them.

Profitability

One important condition for the successful operation of the Society is that it have suitable material foundations (computers, networking tools, etc.).

For this purpose we must increase the material strength of the Society by increasing the number of members and legal member enterprises, by improving the system for payment of membership dues and by organizing some undertakings

(outside commissions for expert activity, preparation of studies, consulting, information services, organizing prime contracting, etc.).

In connection with the latter question there should again be a review of the policy of the NJSZT regarding independent undertakings, within the possibilities given by the MTESZ and the practice thus far. There should be a study of those areas where an independent undertaking could have a role (see, for example, the foregoing in regard to judging software, economic compensation, etc.). There should be a debate of those forms within which the independent undertakings could function (for example, individual expert activity as an NJSZT undertaking or an independent institution belonging to the NJSZT, etc.). There should also be a debate of the possibilities of implementing the high ethical norms to be demanded of the undertakings.

Summing up, we feel that significant tasks await our Society in the next 5 years. In the interest of meeting the tasks at a high level we must courageously take the inititiative and must build ourselves even more into the basic mechanisms which are making electronics a social factor. We await the observations of our members to get this process started and later we will expect their active and enthusiastic support.

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GOALS OF HUNGARY'S JANOS NEUMANN COMPUTER SCIENCES SOCIETY

Budapest SZAMITASTECHNIKA in Hungarian No 4, Apr 86 p 3

[Article by Miklos Havass, first secretary of the NJSZT: "How To Proceed? Starting an NJSZT Debate." The first paragraph is an editorial introduction.]

[Text] The leading body of the NJSZT [Janos Neumann Computer Sciences Society] has been transformed. The new leadership, taking into consideration the changing social environment and the new conditions and building on and accomodating to the earlier successes, is seeking possibilities for further development. With his article Miklos Havass, first secretary of the Society, is turning primarily to the members of the NJSZT but, naturally, also to the profession as a whole. Our editors are publishing the thoughts and ideas of the first secretary to initiate a debate, awaiting the contributions and proposals of the readers which may help a further strengthening of the role of the organization, the solution of its tasks and the realization of its professional goals with the aid of the Society.

Every profession congregating into economic institutions creates horizontal social organizations (clubs, associations) of its members and institutions which recognize and represent their interests and aid the development of the given science as efficiently as possible by organizing the exchange of information. The horizontal organizations of new professions, in addition to the above functions, necessarily support--by their professional openness, growth dynamic and attempt to develop their relationships to already existing structures--the social utilization of their achievements or the discovery of possibilities for such utilization. Virtually at the time of its domestic appearance computer technology created this organization, the NJSZT (or its predecessors). The basic missions of the NJSZT are:

--to aid the further development of computer technology as a profession or science (by using the word computer technology in this article we do not want to take a stand in the question of where the precise boundaries of computer technology, computer science, computational science or informatics are or what the relationship of the concepts is to one another), and

--to support the recognition of the ever broadening applications possibilities and the responsible spread of computer technology.

Fee payment differs from the telegram fee payment procedure used thus far. There is no point in determining the number of words here, especially since in the case of a drawing this would not be at all clear. Fee payment depends on the size of the area to be copied; the basic unit of area is the A/4 format. This procedure is realistic because the facsimile machine examines every square millimeter of the A/4 page and transmits the elementary information to the receiving machine of the partner station.

The first A/4 page costs 70 forints and every additional page costs 40 forints.

The fee is independent of whether there are only one or two words on the document or whether it is completely filled with text. Taking 200 words for a typed page this is substantially cheaper than a telegram. And sending this same page as a telegram takes about 4.5-6 times longer than sending it via the facsimile machine.

The other use area for the facsimile equipment is the Telefax service. The purpose of this service is to permit enterprises to have regular contact with their domestic and foreign partners through the facsimile equipment installed beside their telephones. Practical life proves that facsimile equipment has become a very important and well used office tool in the areas of postal administrations having a developed telecommunications network.

It provides extraordinarily fast exchange of news, and the transmitted document is accepted as a true copy just as much as a copy made by other copying procedures. A signature on the documents is regarded as valid. The possibilities for designing offices are virtually limitless; there is a possibility for very fast modification by virtue of the swift transmission of plans.

Banks and foreign trade enterprises make very wide use of this telecommunications possibility, which does not mean a new, large investment but only the acquisition of the facsimile equipment. The existing telephone network is suitable for virtually immediate introduction of the new service.

The Telefax service has not been introduced officially in Hungary yet, but a few enterprises have recognized the possibilities hiding in it and already have facsimile equipment. These devices were put into operation with an ad hoc connection permit issued by the Hungarian Post Office. More and more requests are appearing on the basis of their experiences.

This fact places a demand on the Hungarian Post Office that it must broaden the use area for facsimile equipment within a foreseeable time and, adjusting to the international needs, it must create the technical and trade possibilities for introduction of the Telefax service.

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HUNGARIAN PHYSICS RESEARCH INSTITUTE'S TPA-11 GRAPHICS SYSTEM

Budapest SZAMITASTECHNIKA in Hungarian No 4, Apr 86 p 5

[Article by Bela Mohacsi: "Graphics Systems for TPA-11"]

[Text] Depicting graphics plays an ever more important role in technical and scientific life for figures contain large volumes of information in a concise but easily processed form. CAD (Computer Aided Design) is an efficient area of computer technology applications the basis of which is computer graphics. The lack of some graphics hardware, and the many types which exist, is holding back domestic development of it. The software assortment is still limited for the peripherals which can be obtained too.

The KFKI [Central Physics Research Institute] is trying to correct this situation by offering two new graphics program systems for the TPA-11 computers and the graphics peripherals which can be obtained domestically. The Interactive Graphics Editor (IGE) is a tool for computer aided graphics preparation while the RGKS offers support for graphics programs developed by the user.

The IGE Editing Program

The IGE is a general purpose, two dimensional (2D) graphics editing program based on devices which can be obtained in Hungary. With its aid one can prepare the drawings needed for technical documentation in a convenient, conversational form. These can be stored on magnetic devices, can be modified later at any time and can be printed out on a plotter.

The graphics tools needed to use the IGE are: a color graphics display, a digitizing table and a plotter. The OCD-500 color display, developed at the Budapest Technical University and manufactured by Orion, the digitizing table of Fokgyem and the plotter developed jointly by the Industrial Instruments Factory (in Iklad) and the KFKI or the Videoton A/3 size plotter can be obtained on the domestic market. Other domestic graphics peripherals can be connected to the system as well.

The editing program can be controlled quickly and easily in a conversational form with the aid of a menu located on the digitizer. Parallel with this the system will also accept commands from the terminal. The operations executed on

the figure in this way immediately appear on the graphics screen. The advantage of the editing program is that it solves the tasks of preparing, modifying and storing the graphic image; one need not bother with paper drawings. In case of need the plotter prepares tangible figures on paper from the stored data. The documentation consisting of figure sheets can contain both graphic and administrative data. The edited figure can be built up out of the following graphic elements: basic elements (segments, broken lines, circles, curves, bands), markers, text and symbols.

The graphic image can be modified by the following operations performed on the installed object: changing or deleting color, line type, etc. and geometric transformations. In the course of the editing work any part can be magnified (zoom). This facilitates the preparation of complicated images rich in detail.

The Device-Independent RGKS

The GKS (Graphic Kernel System) is an international standard for computer graphics which was adopted in 1984 by both the ANSI and the ISO. The RGKS is a version of the GKS for the TPA-11 computers in an RSX-11M or compatible operating system environment.

This is an input/output system which makes possible the device-independent writing of graphics programs. This ensures their portability among work sites equipped with different graphics devices. Thus, for example, a program prepared originally for a color raster display which uses the RGKS routines can prepare figures on a plotter fitted into the system without any changes.

In addition to device independence the RGKS collection of subroutines and functions supports users at a high level in creating graphic images. The programmer can work in the coordinate system best suiting the applications area. He prepares the image in this and the image can be displayed on any of the graphics peripherals fitted into the system. The routines of the RGKS solve all the problems of image display--such as handling windows, transformation of coordinates, etc.--thus facilitating and speeding up the work of programmers less experienced in computer graphics. By creating so-called segments one can prepare parts of drawings which can be transformed and built in many times, further increasing the efficiency of programming. The RGKS supports different data input modes and devices and through them the creation of conversational applications programs.

The graphic image created can be preserved on magnetic background storage in a device-independent form. The data files obtained in this way can also be transferred among RGKS systems. The RGKS corresponds to the so-called 2.B level of the GKS; its routines can be called up from the FORTRAN-IV, FORTRAN-77 and C languages.

The RGKS is a joint product of the KFKI and the SZTAKI [Computer Technology and Automation Research Institute] of the Hungarian Academy of Sciences.

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EAST EUROPE/COMPUTERS

HUNGARIAN UNIVERSITY COURSES IN PREPARING INFORMATION SYSTEMS

Budapest SZAMITASTECHNIKA in Hungarian No 4, Apr 86 p 9

[Article by Istvan Fekete and Mrs Istvan Koncz, computer technology faculty of the ELTE (Lorand Eotvos Science University): "Teaching the Technology for Preparing Enterprise Information Systems at the ELTE, I"]

[Text] Antecedents

Because of the swift spread of computer technology applications, primarily data processing, there is an ever increasing social need for us to graduate from our universities young computer technology experts--after the 3 years of the "first step"--who have mastered the basic theoretical and practical information in the important area of data processing systems and who are capable of working effectively in the creation of larger systems. On the other hand, education must contribute to raising the professional level of systems preparation. One who knows a few of the stubbornly reappearing symptoms of the field will certainly not consider this goal excessive. (It may be enough to refer to a few "weak points" here: the immature nature of user demands, the difficulties of communication among participants, the organization of team work, the interface problems of programs making up a system, the "diseases" characterizing some programs such as the deficiencies of testing, faulty documentation, etc.)

Going beyond the general and permanent process of modernizing instruction the coinciding of several concrete circumstances also moved us to take up again and think through the educational problems of this theme area--which has been part of training since the profession began. We mention here now only two motivating factors.

After the dismantling of the ODRA-1340 computer which had been operating in our faculty for 10 years and the development of the ELTE Computer Center the computer exercises for a number of subjects had to be transferred to the ES 1040 computer. The change in environment, which was already very timely, also prompted us to rework the thematics.

A very significant stimulus in this was given by our contractual link and cooperation, of nearly a year and a half, with the SZAMALK [Computer Technology Applications Enterprise]. In the summer of 1984 the SZAMALK, within

the framework of a research contract, entrusted our faculty with the task of bringing into higher education the systems preparation technologies worked out in the Programming Systems Main Department--naturally with the development of appropriate educational auxiliary materials. This contract was followed by another in fulfillment of which we prepared a collection of tasks for instruction in the DADEX Jackson principle program generator which was also developed there. (The SZAMALK signed these contracts, aimed at modernizing instruction, within the framework of a comprehensive, 5-year OKKFT [National Medium-Range Research and Development Plan] research program financed by the KSH [Central Statistics Office].)

In our work we relied on the significant domestic and foreign data processing experience of the instructors in the faculty, in addition to the diverse (and often not uniform) professional literature.

The Place of Teaching Systems Preparation in the Process of Training

The place in the curriculum for teaching the theme was given in advance--in the fifth semester of training, the first half year of the subject titled Program Packages (also called Applications Program Systems). Not long after the start of the programming mathematician section and the introduction of the two semester subject there was talk of a similar theme beginning in the first semester. This semester has been updated in several respects. (We should mention that in the second semester we teach use of finished system programs and program packages. Here we provide a thorough introduction to the previously mentioned DADEX but it is used elsewhere too--in an optional way even in the first semester. In what follows we will deal only with the first half year of the subject titled Program Packages.)

When teaching the subject comes up in the fifth semester of training the students already have considerable prior knowledge, primarily within the framework of four semesters of the subject titled Programming. First they master use of an abstract programming model created with mathematical precision and rigor in which one can derive the correct abstract program verifiably from the formal specifications of the task. We call the programs for typical, simple, frequently recurring tasks (for example, maximum search) "programming precepts" and use them as such; we solve more complicated, composite tasks by reducing them to these. The students become acquainted with the typical data processing tasks and their various solution principles. In addition to abstract program preparation they get significant programming practice at this time, primarily in the Pascal and PL/1 languages. (Learning an additional five or six languages begins in the fifth semester also.) Within the framework of other subjects they become acquainted with the elements of use of OS JCL and auxiliary programs.

Program Packages not only builds on other subjects it itself also offers aid in preparing the thesis, since it also is a larger size task to be solved independently and which the students start in the fifth semester.

Instructional Goals

In general we have as our goal that the students should become acquainted with the entire life cycle of preparing enterprise systems. They master the methodological principles and documentation standards in connection with each phase. Naturally there is an opportunity in one semester to carry out only a few phases independently; we provide a theoretical overview of the others. We feel that we should not tie ourselves to the formal prescriptions of a single concrete technology. We have formulated the general goal in detail; let us select from this here a few of the factors considered important.

The task to be solved should be connected with some branch of the economy, if possible with some function of enterprise life. In any case the systems character should dominate, that is a number of logically closely interdependent and related data files and programs should make up a working whole. The programs of the system should be large, if not of real size (300-500 lines). It is useful to input elementary economic information too. Examples of the tasks to be solved are: keeping trade records for a commercial enterprise, wage accounting, a library record keeping and loan system, managing savings bank accounts, etc.

The students design the system to be prepared within the organized frameworks of team work. In later phases they work together if necessary; for example, they do joint code reading. It is very essential to learn the joint recording of large volumes of information.

We consider it fundamentally important that the students also perform systems design activity. They do this by starting from a rough customer description of the task; the system design must be developed in the course of consultations with "customers" personified by the leaders of the exercise.

Thinking at the systems level must extend to the computer environment too. Our goal is for the students to view the computer as a complex resource and to use it as such. When preparing the physical system design and in the course of doing the programming they should be thinking at the level of the entire operating system. They should make use of JCL and the auxiliary programs and they might even write smaller auxiliary programs themselves.

The functions of the system should include the typical tasks of data processing, such as table preparation with sum rank, "combing" of serial files, updating, etc.--naturally not in their "pure" form but rather with the special difficulties presented by concrete tasks. They should use the most common auxiliary programs too (SORT, IEBPTPCH, IEBGENER, IEBUPDAT, etc.).

It would be good if the task included files with every type of organization, and if the programs processed these in every way that comes up.

Realization of Instructional Goals

When developing the instructional thematics we started from the side of practical work and took into consideration the work load on the heavily .pa burdened students. The system given in the actual task is realized according

to the phases which can be seen in the table.

Phase	Computer Product	Documentation
0. Customer need		Customer description
1. System design		
a. Logical		Logical system plan (s)
b. Physical		Physical system plan (s)
2. Creating data system	Data files	Program lists
	Auxiliary programs	Program documentation
3. Creating the programs		
a. Planning	Programs (s)	Program lists (s)
b. Coding	Auxiliary programs	Program documentation (s)
c. Testing	Jobs (s)	Test runs (s)
4. System building	Libraries (s)	Test runs (s)
a. Construction	Jobs (s)	User description (s)
b. System test		Developer description (s)

(In practice the life cycle is generally more differentiated, consists of more phases; for example, there could be requirement analysis or operation and maintenance phases. It is also possible that the divisions and the products will be different in some cases. Neither practice nor the literature are uniform in this area.)

Practice has determined what parts of the entire preparation of a system should be given as tasks to the students. In the table we have designated with an (s) the products to be prepared by the students. They get the rest already prepared.

On the basis of pedagogical and practical considerations we decided that

--we should keep the tasks and the work within uniform frameworks during an entire year, and interdependent with this,

--we should "isolate" the several phases--insofar as possible--and should start from uniform starting points so that possible earlier mistakes should not be perpetuated.

The disadvantage of this principle is that it frees the students of the bitter (though instructive) iterations of system preparation, but this could not realistically be made a goal (for example, going back from the level of system test to the level of system design). The most important iteration is in the phase of creating the programs (phase 3) and, naturally, this remains. On the other hand there is a possibility for successful work in every phase independent of the preceding ones. Uniformization is even more important--if possible--from the viewpoint of the instructors.

In accordance with this, after the students finish the logical and physical system plans they do not continue to work from these but rather write their programs on the basis of a uniformly valid system plan prepared by the instructors. In this way the data system can be uniform as well. Every little group gets the same set of data files, which can be returned to their initial state at any time from the base examples. In the course of system building also they do not integrate their own programs but rather fundamentally tested programs prepared by the instructors. We should note that in our case system building--deviating from what is customary--means only the creation and management of module libraries and the creation of large jobs of many steps, and not an exhaustive systems test.

Developing the Computer Environment

In accordance with the conception outlined the instructors undertake a significant part in creating the whole system.

Even before the beginning of the semester they compose the customer description and a uniform, central logical and physical system plan. The customer description is deliberately "flawed" after preparation of the system plans so that it will be suitably deficient, redundant and badly (confusingly) structured--as in life. Meanwhile we create the data system, which we then make as many copies of as we expect to have little groups during the year. In connection with the data system we also make archived auxiliary programs available to the students, which they use while refining and testing the programs. These belong basically in the following groups:

--a listing of the several files,
--new input for the several files from the base example, and
--modification of the several files (for test runs).

We provide, in a source library for preparation of the programs, a record description of the several files, which can be built into the programs as a macro.

We also prepare the programs (or at least some of them) for the complete system, for system building.

In addition a number of jobs must be written which are needed for software handling and maintenance of the system, for example disk freeing, library handling, etc.

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EAST EUROPE/COMPUTERS

BULGARIAN IBM-PC COMPATIBLE MICROCOMPUTERS

Budapest SZAMITASTECHNIKA in Hungarian No 4, Apr 86 p 13

[Unsigned note accompanying photograph of an ES 1832 computer: "Bulgarian MIcrocomputers"]

[Text] The year 1985 brought a turning point in the field of 8 bit computers--development of the M8000 based machines stopped and only the IZOT 1041 appeared in the category of computers built into desks. The IZOT 0220.M2 was replaced by the smaller ORGTECH 80/600 dual processor machine which could be put on a desk; it operates with the CP/M operating system in addition to Motorola MDOS. Series manufacture of 16 bit micros compatible with the IBM-PC began last year. New items at the Plovdiv fair included an Intel XT machine compatible with the PC/XT and the ES 1832 compatible with the IBM-PC. An interesting feature of the latter is that it is made basically only of parts manufactured by socialist countries, and it has already passed international testing. A new item which fills a gap is the DEC compatible IZOT 1060 image processing system; the Soviet Union and Hungary participated in its development. The SZKI [Computer Technology Coordination Institute] provided software and fit its MP80 printer to the system.

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EAST EUROPE/ FACTORY AUTOMATION

USE OF ROBOTS IN CSSR SKODA PLANT

Prague TECHNICKY TYDENIK in Czech No 8, 18 Feb 86 p 6

[Unattributed article: "Robots at the Plzen Skoda Plant; Research on the Use of Automated Systems"]

[Text] The objective of the first stage of robotization at the Plzen Skoda enterprise was the installation by the end of this year of 4-6 experimental worksites in basic technological fields which could be used to test possible applications of industrial robots and manipulators, the operating conditions and operation of these automated systems and, of course, to obtain valuable experience for their further application.

Currently, operational testing is taking place based on these designs of a FR 16 P pillar manipulator for the placement and removal of rotating, flanged parts on numerically controlled lathes at the Electric Locomotive plant. In the stamping shop of this plant in 1986 a large assembly line will be completed that will use three M 40 manipulators and numerous assorted peripheral equipment for operating the knives and presses. Here also operational testing is taking place of a large, multipurpose 2-station worksite for the arc welding of medium sized parts for locomotives with the help of robots.

Let us note the problem briefly. It is clear that Skoda electric locomotives, which are produced for the railways of Czechoslovakia, the Soviet Union, Poland, Bulgaria and Yugoslavia, must provide reliable and safe transportation under all climatic conditions and under rigorous technical conditions.

For instance, meeting the standards for welding locomotive parts requires specially trained welders who have passed a state examination. Their work must hold up under use in dynamically stressed assemblies with a high degree of safety.

Because, however, production capacity has been increasing and because there is a permanent shortage of highly qualified welders it was decided to design a robotized welding workstation that would be ideally suited to the difficult conditions of a 3-shift heavy engineering production operation. This robotized work station reduces the labor component of welding by 60 to 80 percent, has reduced as well the labor involved in cleaning welds, and has reduced labor requirements over 3 shifts by 20 people. Another advantage to the automatic welding of smaller size parts is savings of welding wire and electricity.

It is also important that there are no longer losses stemming from the idling of welding machines and lighting costs have been reduced. Together these savings amount to about 320,000 kilowatt hours. Of greatest importance, however, is the high quality of the welds, the elimination of the tiring and hazardous work of the welders, and a substantial improvement in the working environment in the production hall.

At the Ejpovice plant a punch press has been installed that utilizes a portal type manipulator to handle the sheet metal. In conjunction with the Foundry Research Institute in Brno the Ceske Budejovice plant has been testing the burning off of risers with cutting oxygen, using a PR 32 E Czechoslovak robot to handle the castings. The installation is also planned this year of two additional welding worksites utilizing robots at the Ostrov and Dysina plants.

Initial experiences from the installation of industrial robots and manipulators at the Plzen Skoda plant have confirmed that currently available automated industrial robots and manipulators are best suited to mass production runs. Short production runs or piece work do not involve the conditions for the application of industrial robots and manipulators as currently manufactured in Czechoslovakia.

Relatively independent, automated industrial robots and manipulators will find productive application in situations where digitally controlled production processes have not made so far inroads. At the Skoda plant this involves mainly welding, surface treatment work and even certain manual and fitting tasks, technical inspections, etc.

Installing industrial robots and manipulators to perform technical functions not only conserves labor but also increases the sophistication of the entire production process.

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FIVE YEAR PLAN FOR HUNGARIAN METALLURGY SET

Budapest KOHASZATI LAPOK in Hungarian No 3, Mar 86 pp 97-101

[Article by Istvan Soltesz, graduate metallurgical engineer, retired deputy minister and president of the National Hungarian Mining and Metallurgy Association: "The Stressed Tasks of the Seventh 5-Year Plan of Hungarian Ferrous Metallurgy--Energy and Material Conservation, Use of Wastes and the Spread of Electronics in the Branch," given as the opening speech at the ninth plenary session of the ONYAK, Siofok, 4 September 1985. The first paragraph is the Hungarian summary.]

[Text] He first reviews the circumstances, characteristics and achievements of the Sixth 5-Year Plan, with special regard to management in 1984-85 (fulfillment of domestic needs and export obligations). He examines the results achieved in the government programs aimed at energy rationalization, economical use of materials, modernization of technology and use of wastes and secondary raw materials. He gives further thoughts on the technical level and the developmental goals--tasks in the areas of energy conservation, more intensive use of wastes and reducing the use of material. In all this there will be an increased introduction of electronics to aid the experts.

It would be useful to discuss the stressed tasks of the Seventh 5-Year Plan of Hungarian ferrous metallurgy by reviewing the ferrous metallurgy achievements of the Sixth 5-Year Plan and determining the chief tasks for the coming plan period with a knowledge of the production and economic conditions which developed in the Sixth 5-Year Plan period.

Within the framework of this introductory opening speech it cannot be our goal to strive for completeness but only to offer for debate a few of the more important problems.

The overproduction and structural crisis which appeared in world metallurgy in the first half of the 1980's had an effect on Hungarian metallurgy too. This did not mean primarily a quantitative limit on metallurgical export but rather a significant reduction in the price of metallurgical products. The prices of steel and nonferrous metals are lower as compared to the 1980 price level by 30-50 percent.

In the years of the Sixth 5-Year Plan Hungarian ferrous metallurgy hardly reduced its production compared to the production of 1980. In essence, with a quantitative decrease of 2-3 percent (700-900 kt per year for non-ruble accounting export), it played a significant role in ensuring the balance of the economy's convertible foreign exchange balance. The annual export of the branch, worth about 250 million dollars, represents about 6 percent of the non-ruble accounting export of the people's economy.

Our administration constantly watched the economic activity of the ferrous metallurgy enterprises and took the necessary measures in the interest of ensuring operability. The 1980 average sales price of 316 S/t fell to 212 S/t by 1985.

Since the volume of export deliveries comes to 30 percent of the production by plant, and so plays a significant role in the development of specific operational general costs, maintaining the export also serves plant interests outside of the interests of the people's economy. In the developed industrial countries they evened out the world-wide structural crisis of ferrous metallurgy by increasing production of higher priced products with greater use value and by greatly decreasing the volume of commercial products.

The product structure change demanded by the user branches is also an urgent task for Hungarian ferrous metallurgy. Carrying this out was made difficult and in cases was made impossible during the Sixth 5-Year Plan by the strong developmental limits aimed at maintaining the solvency of the people's economy and by the investment burdens of steel manufacturing and crude iron manufacturing developments started in an earlier period.

Our three large metallurgical plants with a complete vertical structure became lastingly deficit operations and operations with a fund shortage due to the effect of the large investment burdens and the monotone decrease in average prices on the non-ruble accounting market. An adjustment of their economic situation became absolutly necessary in 1985 in the interest of the enterprises and the branch being able to carry out the tasks of the Seventh 5-Year Plan.

Several Thoughts About Management in 1984-1985

When working out and fulfilling their annual plans in recent years the ferrous metallurgy enterprises have satisfied the expectations of the people's economy in a manner worthy of recognition. When working out their plan target goals they interpreted the national economic priorities as an enterprise goal and in the course of implementing these:

--they regarded as primary the satisfication of domestic needs and they contributed to a significant degree to improving the national foreign exchange balance by increasing export,

--by fulfilling socialist export obligations in time they provided reliable cover for obtaining the necessary socialist import.

They realized all these goals under management and operational conditions which became less favorable year by year. The ferrous metallurgical enterprises contributed to the improvement of the convertible foreign exchange balance, being treated as a stressed national economic goal, with a positive balance of 118 million dollars in 1983 and 170 million dollars in 1984. They could realize this positive balance, for example, by providing 879 kt of rolled goods for convertible export in 1984 compared to the 700 kt in the calculations of the National Plan Office (as a result of the enterprise efforts and market policy work).

In addition they also satisfied domestic supply and socialist export obligations at an acceptable level.

Primary material supply has caused problems in the ferrous metallurgy enterprises for years, and this persists unchanged in 1985. Indeed, new problems have appeared as well, interdependent with the energy limitations at the beginning of the year. These continued as a result of the problems interdependent with the limit on annual energy use. The production problems arising from the renovation of the BEM [Borsod Ore Dressing Plant] sintering works also caused an increased problem this year.

The primary material and energy supply problems appeared partly in disturbances to the production process but also in the scheduled deliveries, and they greatly influenced the development of enterprise results.

The leading bodies of the enterprises prepared action plan proposals to moderate the unfavorable effects of their production problems and to make up for the lost production.

In addition to the enterprise measures they received significant state level aid. In this connection we must mention the preferential treatment of the wage costs for the extra work time expenditure necessary to make up for production lost due to the energy limits. Within this framework we approved a wage preference up to 42 million forints for 11 enterprises, two thirds of the 60 million forints extra wage costs arising. One third of the extra wage costs burdened the enterprises. Let us note in this connection that we established a production value requirement for making use of the preference. It is causing a problem that in a few enterprises, because of the lower level of capitalist export sales prices, the production value taken into the calculation is unrealistic today.

On the basis of a resolution of the directing council of the Hungarian Iron and Steel Industry Association we prepared a comprehensive survey of the total effect of the energy restriction. It can be established from this that there was lost production value at our enterprises due to the energy restriction totaling 1.6 billion forints, of which 84 percent can be made up by enterprise measures.

In connection with the energy limitation the enterprises are burdened with 609 million forints in extra costs, of which 233 million forints is the extra cost of energy substitution and conversion and restoration of equipment.

Despite all this, ferrous metallurgy, as a "crisis branch," fulfilled or is fulfilling the national economic expectations in the present plan period with disciplined work. Thus the firmness of the metalworkers deserves recognition and thanks here also.

The enterprises of the ferrous metallurgy branch undertook execution of significant tasks in the government programs started during the Sixth 5-Year Plan and aimed at energy rationalization, economical use of material, modernization of technologies and use of wastes and secondary raw materials in order that they should be able to meet the production and economic goals of the Seventh 5-Year Plan.

In general ferrous metallurgy is characterized by significant material and energy use. Net material costs represent 76 percent compared to the gross production value of the branch. Energy cost is about a third of the material cost.

The relatively high material and energy use are closely interdependent with the fact that the quality of the crude ore delivered to the sintering lines is substantially worse than the quality of the ores used in the developed industrial countries and in the other CEMA countries, so we can smelt in the crude iron manufacture phase only with about 25 percent more energy use.

The total primary energy use of Hungarian ferrous metallurgy in 1984 (122 PJ) was 9.4 percent of the primary energy use of the people's economy. This value is equal to or less than the energy fraction used in the ferrous metallurgy of the FRG or France (9.8 and 10.1 percent respectively). The high specific energy use appearing at the low use level is also caused by the disadvantageous deviation of the form, chemical and mechanical properties of the domestic finished products produced.

Studying the energy use of the chief manufacturing branches of ferrous metallurgy we find a 7 percent share for the sintered ore, a 43 percent share for manufacture of crude iron, and a 9 percent share for steel manufacture. So the two manufacturing branches using the most energy (sintering and crude iron manufacture) require more than half of the 122 PJ energy use. Because of the very bad charge mixtures the specific energy use representing the national average in crude iron manufacture is 23 GJ per ton (in contrast to the Soviet and American 17.2 GJ per ton, the Japanese 15 and the FRG 16 GJ per ton energy use indexes).

This is actually where our extra energy use of about 40 percent appears, and it cannot be compensated for in the steel manufacturing or rolling phases. The 7 GJ per ton extra energy use appears not only in the energy cost in the crude iron manufacturing phase, a cost greater by about 1,000 forints per ton, but also in the fact that because of the low mixture yield (44 percent as compared to a value of 56 percent for developed industrial countries) the volume of slag arising during smelting is more than 800 kg per ton as opposed to the normal 350 kg per ton.

Handling a volume of slag greater than normal involves extra costs and activity harmful to the environment. Our energy use in the other phases of manufacturing finished rolled goods--steel manufacture, continuous casting and rolling--meets the international norms.

All this results in the fact that the energy use for production of one ton of finished rolled goods is greater in the final phase by 4-5 GJ than the good international average.

After all these preliminaries we would like to call attention to the stressed tasks of the Seventh 5-Year Plan for ferrous metallurgy, noting in advance that the developmental possibilities are extraordinarily modest--about one third of the development sum for the Sixth 5-Year Plan--while the tasks and expectations are significant.

As can be seen from what has been said, metallurgical developments have two key questions. One is a significant reduction in the material and energy demand, the other is to supply products of a good better quality than heretofore for the vertical structures building on ferrous metallurgy (the machine industry, construction industry, construction materials industry and transportation).

Ferrous metallurgy must devote a significant fraction of the developmental possibilities to investments serving to satisfy the quality demands, thus increasing the competitiveness of the processing industry, primarily the machine industry.

Several Thoughts About the Technical Level and Developmental Goals

For decades, when determining annual plan tasks and developmental policy, as formulated in medium-range and long-range plans, Hungarian ferrous metallurgy has been guided by the principle that at the same time it ensured its profitability it should satisfy ever more fully the quantitative and qualitative product needs of the domestic processing industry. Thus far it has not been able to meet this dual expectation to a satisfactory degree because of inadequate developmental possibilities, and it probably will not be able to in the period ahead either. The condition of the producing equipment is unfavorable. A crucial part of the fixed assets making up 28 percent of the gross fixed assets worth 15 billion forints, and written off to zero, consists of machines and equipment. There is no cover for the replacement of them. In recent years 300-400 million forints have been turned to maintenance of level investments each year; this sum is 0.6-0.8 percent of the gross value of fixed assets and does not even reach the 2 percent which can be regarded as the minimal level. For this reason we must turn significant sums to maintaining the fixed assets. The cost of maintaining fixed assets came to about 7 billion forints per year in 1983 and 1984.

For this reason, in their annual plans, in addition to planning production and management tasks, the enterprises are dealing in a stressed way with manufacturing and product development which will modernize the product structure, improve quality and result in material and energy savings and with experiments and research aiding this.

In the interest of ferrous metallurgy being able to satisfy the expectations of the processing industry at a higher level, keeping in mind the possibilities, the minister of industry invited Soviet experts to study the developmental goals.

As a result of the deliberate development policy of the past decade the structure of domestic steel manufacture has been modernized significantly. The 91 percent share of SM steel manufacture has been reduced thus far to 53 percent. Virtually every type of steel can be produced in a quality meeting the needs in oxygen converters, (in electric furnaces) and in container metallurgy equipment. In the area of hot forming technology six of the obsolete shaping mill lines have been shut down and three modern lines have been built in their place. At the same time there has not been any significant progress in modernization of finishing, pipe manufacture and heat treatment. The expansion of second and third product manufacture lags behind the expectations. With a few exceptions the quality of our free forming forging operations, foundries and manufactured products do not meet the needs of the machine industry. Ferrous metallurgy is also significantly backward in regard to modern material testing systems and product selection and classification equipment.

In the industrial block conception and in the seventh 5-year development plan for ferrous metallurgy the goal is a solution of the problems raised. In the plan period the branch would need a minimum of 16 billion forints to meet the expectations of the people's economy.

In this case the production of second and third products would increase by about 30 percent and there would be a significant quality improvement in about 30 percent of the castings and free formed forging products.

There would be an improvement in the internal material properties, size precision and surface quality of the products, primarily thanks to the development of testing techniques. It would become possible to increase the ratio of alloyed and high strength products. Unfortunately, because of the difficult situation of the economy, we can count only on a smaller development expenditure. For this reason the developmental ideas for ferrous metallurgy must be thought through repeatedly in a basic way so that it will meet the expectations of the people's economy and of the domestic machine industry therein at least in the most important areas.

It must be kept in view and must be made convincingly clear to everyone that every country with a developed machine industry constantly cares for the modern level and development of the most important background industry for the machine industry, namely ferrous metallurgy. The availability of a suitable ferrous metallurgy background is a condition for the development of the machine industry, naturally in our country as well. This requires, in addition to the efforts of the ferrous metallurgy enterprises and central support, that the user enterprises also participate in metallurgical developments.

A Few Words About Energy Conservation Tasks

In the course of competitions announced within the framework of the government's energy rationalization program our ferrous metallurgy enterprises have started the following investments, which have been completed or are expected to be completed this year:

--increasing the temperature of the OKU [Ozd Metallurgical Works] blast air to 1,100 degrees Celsius, 685 million forints under the heading of modernization of auxiliary equipment for crude iron manufacture,

--second breaking and classification of sintered ore as a reconstruction of the BEM, a joint undertaking of KOKOV [Joint Enterprise to Prepare Metallurgical Primary Materials], the OKU and the LKM [Lenin Metallurgical Works], 1,046 million forints under the heading of breaking and classifying agglomerate ore,

--reconstruction of the air heating equipment at the LKM, heating the blast air to 1,100 degrees Celsius, 500 million forints,

--converting the No I blast furnace at the DV [Danube Iron Works] to high throat pressure, increasing the oxygen content of the blast air and increasing the blast air, 700 million forints.

Thanks to the investments, totaling about 2.9 billion forints, it will be possible to achieve a 120 kt absolute coke saving per year in the furnaces, worth about 600 million forints, by reducing energy use by 3.2 PJ per year. The full savings can be expected a year to a year and half after completion of the investments.

We should note that the reconstruction of the BEM did not conclude or is not being concluded with the planned result, so an absolute coke saving of about 65 kt per year has been endangered.

Within the framework of the government program aimed at intensive use of wastes and secondary raw materials both the Ozd Metallurgical Works and the Danube Iron Works started an investment to reclaim the iron containing material of the Martin and blast furnace slag which has existed for several decades, investments valued at 2.1 and 0.9 billion forints respectively. As a result of the 3 billion forint development they will be able to save 26 kt of blast furnace coke per year at the OKU and 20 kt at the Danube Iron Works by providing about 60 percent iron content charges which can be fed into the blast furnaces using the 200 and 120 kt quantity reclaimed respectively. These investments will make possible an additional energy saving of 1.2 PJ per year to a value of about 230 million forints. The investments were completed last year, they are expected to get into operation this year, and so the entire energy saving will provide a foundation for energy management in the Seventh 5-Year Plan. Unfortunately the partial results of the investments during the 8 elapsed months this year have not yet justified the expectations.

It is a task to see that the effectiveness of the approximately 6 billion forints of investment activity figuring in the two government programs develops according to the expectations, because the burdens of these investments are great sources of the 1985 deficits of the enterprises. Liquidating these losses is an expressly enterprise task.

A number of tasks also derive from the government program titled Economical Material Use and Modernization of Technologies.

We produce 40 percent of the domestically manufactured steel with modern crystallizing equipment, with so-called continuous casting. This figure reaches the international average.

Continuous casting has a number of advantages, among which is an approximately 15 percent improvement in yield, so the economicalness of steel manufacture or rolling can be increased as opposed to traditional casting.

In the interest of increasing the economicalness of manufacture of rolled goods we must have as a goal in the coming plan period an increase in the capacity of the three existing continuous casting works, achieving nominal capacities which will raise production as follows:

--from the present 1.1 Mt per year to 1.2 Mt at the Danube Iron Works,

--from the present 378 kt per year of the six-strand casting machine at the Ozd Metallurgical Works to 500 kt per year, expanding to seven-strand with the aid of the investment now under way and by building a resting or feeding furnace making possible increased exploitation of the sequential casting possibility,

--from the present 275 kt per year use of the five-strand continuous casting works being put into production at the Lenin Metallurgical Works to the planned 370 kt per year.

As a result of these measures we will be able to produce 53 percent of the national fluid steel production with modern equipment. By increasing the volume of continuously cast ingots, about 250 kt per year, we will be able to save 44 kt of steel, which means a material saving worth 400 million forints per year.

With this quantitative increase in continuously cast ingots the specific material use of 1,231 kg per ton, as projected presently for finished rolled goods, will improve to 1,216 kg per ton.

Use of Electronics in Ferrous Metallurgy

It is well known that electronics is conquering more and more fields in every area of life. This is true of ferrous metallurgy as well. The results which can be expected from use of modern automatic devices include:

--increasing material yields,

--reducing material and energy costs,

--improving the properties of products, increasing productivity thanks to the production of reproducible products,

--reducing manpower needs,

--better organized production and environment protection.

The presently existly low level of automation in ferrous metallurgy hurts economicalness and has a harmful effect on the quality of finished products. The Danube Iron Works and the Lenin Metallurgical Works built their converters with modern measurement, regulating, control and feeding equipment. Computerized process control equipment has been installed in both plants also. The new 80 ton UHP arc furnace at the LKM and the continuous casting works both have modern measurement, regulating and control equipment. Using this as a base we must make it possible to build similar microprocessor measurement and control equipment in the continuous casting works of the DV and the OKU.

In the case of technological equipment where automatic devices can be built in with minimal reconstruction they should be equipped with basic instrumentation aiding economical operation of the equipment in the next plan period.

Electronic scales and automatic feeding equipment which check material flow and ensure the quality of some technological processes should be installed in the plants. It would be good to use robots in the forging plants and foundries; we have seen the first steps toward this at the Csepel Iron Works.

There are very narrow material possibilities for spreading electronics, because electronics can be used effectively only by installing modern manufacturing equipment.

By bringing up these few problems we have tried to direct the attention of the experts toward acceptance of an economic concept affecting every branch of the people's economy.

We feel that describing the technical possibilities and solutions in the course of the section meetings will offer a satisfying support for meeting the tasks and expectations of the coming plan period.

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